Urolithiasis

Non-surgical strategies in the treatment of complicated renal stone

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Modern technological advances have profoundly altered surgical attitudes in the treatment of renal calculi. Extracorporeal shock wave lithotripsy (ESWL) is usually suitable for the majority of simple renal stones. Percutaneous nephrolithotomy (PCNL) has emerged as a suitable alternative to surgery in the definitive management of more bulky, complicated stones, deployed either alone or in combination with ESWL. The increasing use of internal double-J ureteral stenting has extended the application of ESWL monotherapy in selected cases presenting complicated renal stone. In this paper, we evaluate the results in deployment of these various non-surgical modalities in 447 cases of complicated renal stone presenting in 444 patients over a 4-year period.

Complicated calculi are here defined as single, branching or multiple stones with a cumulative renal stone burden in excess of 5 ccm (equivalent to a single spherical stone greater than 21.3 mm diameter). 140 kidneys showed single stones, 166 multiple and 141 staghorn calculi. The proportion of single calculi in the group treated by PCNL monotherapy was greatest (39.8%), whilst all patients requiring a combination of PCNL and ESWL presented multiple or staghorn calculi.

Of 34 cases subjected to stage ESWL monotherapy, 34.8% of those reviewed at 3-month follow up still showed residual stone fragments 3 mm or greater in diameter. This was even higher (57.5%) in the group of 76 patients treated by ESWL monotherapy and double-J ureteral stenting. In the 73 cases treated with a combination of PCNL and ESWL, around one-quarter of those reviewed at 3-months showed residual fragments larger than 3 mm. Conversely, only 8.7% of the remaining 264 cases treated by PCNL alone were discharged with residual fragments 3 mm or larger in diameter.

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Simultaneous treatment of calcium oxalate and uric acid stones in Saudi Arabia

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Two treatments were devised to prevent idiopathic calcium oxalate (CaOx) and uric acid (UA) urolithiasis in a Saudi male population whose main urinary risk factors are a low urine volume, low pH, extensive mild hyperoxaluria and hyperuricosuria. The dietary intake, intestinal absorption and urinary excretion of calcium, on the other hand, are generally low in this population.

In the first treatment, Super Citracal (an effervescent form of calcium citrate) was given at a dose level which supplied an additional 960 mg/day of calcium. This was divided into two doses and dissolved in water - the first taken with lunch and the second with the evening meal. This was designed (a) To lower dietary oxalate absorption, (b) to alkalinize urine, (c) to increase citrate excretion, (d) to potentiate inhibitors of crystallization and (e) to increase fluid intake. Twelve idiopathic stone-formers were studied for two weeks on a basal diet and then for a further two weeks on their basal diet supplemented with Super Citracal. Two 24-h urines were collected from each patient during each period and analyzed for risk factors. Urine volume, pH and citrate excretion were little changed between the basal and treatment periods. The Ca/Cr and Mg/Cr ratios both increased ($P < 0.05$ for each cation) and the P/Cr and Ox/Cr ratios decreased ($P < 0.05$ and 0.001 respectively). all oxalate excretions except one fell into the normal range. This form of treatment markedly reduced the risk of Ca Ox stones.

In the second form of treatment, calcium carbonate (providing 1000 mg/day extra calcium) and Polycitra K (a mixture of citric acid and potassium citrate providing the equivalent 60 mEq/day of alkali) were used. Twenty idiopathic stone-formers were studied using the protocol described above. Urine volume was unchanged between the basal and treatment periods. The Ca/Cr ratio fell slightly but not significantly, P/Cr and Ox/Cr both decreased ($P < 0.001$ and $P < 0.02$ respectively) and urine pH and citrate excretion both increased ($P < 0.001$ in each case). The net effect of these changes was to reduce markedly the risk of both Ca Ox and UA stone-formation in all patients.

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Evaluation of treatment of uric acid staghorn calculi

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We have evaluated the various combination of medical treatment, extracorporeal shockwave lithotripsy and percutaneous nephrolithotomy in the treatment of uric acid staghorn calculi. Data on 17 uric acid staghorn calculi in 16 patients were available for follow up (12 men and 5 women between 19 and 60 years old). eleven patients had persistent hyperuricaemia, 3 had reduced renal functions and 3 had urinary tract infection. Asymptomatic uncomplicated stones were treated primarily medically. Symptomatic, complicated and stones not responding to medical treatment were treated with various combinations of treatment.

We believe that combination of treatment modalities should be considered in the management of uric acid staghorn calculi.

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Chemical composition of urinary stones in Jeddah: A study of 441 samples and a proposed new classification

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In this study, the proposed classification is based on the % composition of ions in 441 samples from 331 urinary stones subjected to varieties of chemical analytic techniques in addition to elemental microanalytical determination of the total carbon, hydrogen and nitrogen content. Accordingly the urate stones (17.5%) contain >20% of uric acid, 0–10% of phosphate and four ranges of oxalate. The oxalate stones (62.8%) contain >40% oxalate with <20% of either urate (Ox11, 7.7%) or phosphate (Ox12.5) or both (Ox12, 50.1%). On the other hand the phosphate ones (15.2%) contain >10% phosphate, <10% urate and oxalate either <40–10% (Ph11, 10.4%) or <10% (P12, 4.8%).

Unlike the above non infection (Category I) stones, the infection ones (Category II, 4.5%) contain Mg >3% and include one infection urate stones (Ur111, 0.2%) and 19 infection phosphate samples (4.3%) subclassified into 3 subgroups according to their calcium and oxalate content.

Elemental microanalysis proved to be an efficient tool not only for the quick identification of stone types or urate groups but also for the identification of some variants and form of compounds. This classification adequately encompassed all the samples and correlated well with the clinical and biochemical picture of the patients.

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Trace elements in serum urine and stone in stone former patients: comparison with chemical and polarized analysis of the stone

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A single metabolic or physiologic process is seldom responsible for the formation of urinary calculi. The present study was undertaken to investigate some trace elements (zinc, copper, lead, aluminum and magnesium) in urine, serum and stone in stone former patients and control group; in comparison with chemical polarized analysis of the stones. Fifty one stone former patients (stone bladder 7, stone ureter 13 and stone kidney 31 patients, 9 of them with multiple stones) and twenty healthy male control participated in the study. Serum and 24 hour urine were collected and all patients were kept on a free diet. The concentration of trace elements were determined by atomic absorption spectroscopy and placentomio to emission pectroscopy. All calculi were analyzed using chemical and polarization unicroscopy analysis. The results showed that there is a significant increase of zinc and copper in urine of stone former, more in those with multiple stones and both decrease in serum with significant increase of zinc in appetite more than whewellite stone. As regards lead and aluminum there is insignificant relationship with appetite and whewellite stone with insignificant change in urine or serum level of both. Magnesium decrease significantly in urine or serum level of both. Magnesium decrease significant relationship between chemical and polarization microscopy analysis of the stone and the distribution of different trace elements in urine and serum of stone patients. Zinc urinary level increased significantly ($P <$ 0.001) in whewellite, than appetite stone patient. On the other

hand magnesium concentration in urine decreased significantly in appetite more than whewellite stone patients. Finally, we believe it is essential to stress that the change of any trace element in stone former patients is not necessarily the cause of formation, but rather could be an effect of such formation.

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Experience with a new multi-functional lithotripter MFL5000 - result of 300 treatments

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The MFL5000 (Dornier/Philips) represents a new multifunctional table for urologic diagnosis, endo-urology and ESWL. Features of this bath-free device include:

- Stone location with tiltable U-arm,
- Dornier shock wave generation unit,
- Low pressure generator, modified ellipsoid and twin pulse technique,
- Additional ultrasound location.

From April 1988 until December 15th 1988, 366 procedures were performed including 32 ureteroscopies, 27 percutaneous nephrolithotomies and 307 ESWL treatments. All pre-ESWL adjuvant procedures were done on this table like retrograde stone manipulation, insertion of a double stent or placement of ureteral catheter (n = 109). Stone location comprises 38.1% caliceal stones, 17.9% renal pelvic stones, 28.9% ureteral stones, 2.9% branched calculi and 12.1% multiple stones in one renal unit. Intra-operative treatment data are compared to the upgraded Dornier HM3 (results in brackets): Secondary and multiple treatments 14.1% (12.5%), mean no. of impulses 2650 (2153), procedural time 29 min. (17 min.), mean final generator voltage 20 k.v. (20 k.v.). Stone disintegration was successful (stone free or particles less than 3 mm) in 92.9%. In 140 patients on overall stone free rate of 69.4% was observed at 3 months follow up.

Conclusion: The results are comparable to those achieved with the upgraded Dornier HM3. Peronal analgosedation was sufficient in 96.5%. The machine has advantages for the treatment of ureteral stones. There is a slight increase in secondary treatment requirements and procedural time. Excellent imaging qualities are provided by a 14 inch image intensifier. The possibility to switch the X-ray tube to an under-table position considerably reduces X-ray exposure to patient and urologist. Performance of all endo-urologic procedures proved to be very satisfactory.

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Second generation lithotripter (lithostar) in the management of renal and ureteric stones

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ESWL has become the accepted method to treat surgically active stone disease in the kidney and ureter. The first 200 patients treated with the second generation lithotripter (Lithostar) at King Abdul Aziz University Hospital were evaluated. The patient data, stone load and distribution, technique, complications and results will be presented.

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In situ extracorporeal shock wave lithotripsy in ureteric calculi

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Since the introduction of ESWL, Dornier HM3, at Riyadh Armed Forces Hospital in January 1985 and up to February 1989; 2400 treatments were performed to treat about 1650 patients with renal and ureteric calculi (1.4 treatment per patient). 350 (21%) of these patients were with ureteric calculi; 170 upper ureteric and 180 lower ureteric (25% sacral calculi and 75% distal pelvic calculi). Patients included adults and children with an average age of 40 years, and the male to female ratio was 4:1. Of the ureteric stones 67% were virgin, 28% post-ESWL and 5% were recurrent. The size of the stones ranged between 0.5 and 5 cm. 7% of all the ureteric stones were faint/lucent stones. 85% of the patients received in situ ESWL monotherapy whereas in the rest 15% per treatment ureteral

stenting was used. The main post-ESWL complication was Pyrexia/sepsis which amounted to 10%. Post-ESWL auxiliary procedures were needed in 8%. The mean hospital stay was 7 days. 90% of the patients were followed up for at least 3 months. 92% of the lower ureteric and 86% of the upper ureteric calculi patients who were followed up, were clear of stones. The overall stone clearance rate was 89%, while the rest 11% had residual fragments of 2 mm or more. It is concluded that in situ ESWL monotherapy is an effective and safe method for treating patients with ureteric calculi and should be considered as a first line method of treatment. In conjunction with the use of ureteric stents in certain situations the stone clearance rate is definitely increased.

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Our first 70 cases of extracorporeal shock wave lithotripsy with sonolith 3000

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From September 1988 to February 1989, 58 patients representing 70 renal units and 112 stones, underwent ESWL with the Lithotripter SONOLITH 3000. 55 out of the 70 cases were renal, whereas 15 were ureteric (11 upper; 3 middle; and 1 lower). 120 treatments were necessary and the average number of shocks per treatment was 2742. The rate of re-treatment, 41.2% (29/70) reflects, in this series, the rate of multiple and staghorn stones which is 45.7% (32/70). Given in terms of "fragmentation" and not "stone-free" because the follow up period is not long enough, our results are 75% overall success with 2 sessions and 93% success with more than 2 sessions.

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Size of renal calculi in the era of extracorporeal shock wave lithotripsy

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Urolithiasis is making 28% of the urological workload in Saudi Arabia. Most of the stones are calcium oxalate (76%), followed by urate (20%) and the remaining are phosphate stones (4%). The first lithotripter in the Kingdom was installed in January 1985. Since then, more than 10 lithotripters are in operation. Through our experience in treating more than 3000 patients with urolithiasis and performing more than 3,000 ESWL treatments over the past ten years, we observed a big change in the pattern of renal calculi. Comparing the size and location of renal calculi in the pre-ESWL era (1980–1984) with the ESWL era (1985–1989), we found a decrease of bulky stones from 28% to 15% and an increase in small solitary stones from 14% to 50%. In addition to that, 95% of patients in the ESWL era had received ESWL or other treatments, compared with 36% in the pre-ESWL era.

Conclusion: With the introduction of ESWL, which is the best invasive treatment, patients are presenting earlier with small renal stones and consent is more easily obtained for ESWL than for open surgery.

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Estracorporeal shockwave lithotripsy Dhahran Health Centre experience

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240 patients with urolithiasis were treated on Siemens Lithostar between October 1989 and December 1990 in Dhahran Health Centre. They required 266 treatment sessions. Renal calculi 79% and ureteric calculi 21%. Age varied between one year and 76 years. 26 patients required more than one treatment session; they had either multiple or staghorn calculi. There was no significant morbidity and no mortality in this series. Results showed 80% of those patients treated by one session are stone free at 3 months KUB. 26 patients were treated by multiple sessions for large load of calculi. 10 patients are stone free after the last session of treatment.

It is concluded for this review, that the Lithotripter is quite efficient in treating patients with urolithiasis, but close follow up of patients is mandatory.

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Extracorporeal shock wave lithotripsy in schistosoma patients with stone formations

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29 Schistosoma patients with stone formations (1 female, 28 male) were treated by Extracorporeal Shock Wave Lithotripsy (ESWL) between February 1985 and June 1989. Of these stone formations 24 were virgin and 5 were recurrent with mostly obstructed kidney but with good kidney excretion according to IVU. Duration of symptoms varied between 2 weeks and 20 years. Of the total number of patients 20 (69%) were cleared of stone formation, 7 (24%) did not return to the follow up clinics and 2 (7%) did not pass stones, so we were forced to surgically remove the stones and reimplant the ureter in the form of ureteroneocystostomy.

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Extracorporeal shock wave lithotripsy in ectopic kidneys with stone formations

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26 patients (21 male, 5 females) with ectopic kidneys (16 Horseshoe, 8 Pelvic and 2 Transplants) with stone formations were treated by ESWL from January 1985 to June 1992 in our unit. 21 of the patients were Saudi, 5 non-Saudi. 24 patients presented with virgin stone formations, and 2 with recurrent. Duration of symptoms spanned 6 weeks to 10 years. The number of treatments per patient varied between 1 and 8. All patients were treated in either renal or semi-supine positions, and one case in the prone position. The number of shocks varied between 50 and 2000. X-ray times averaged 180 seconds. Post ESWL additional intervention was needed in 3 cases (Pyelolithotomy). There were no significant complications. Our results with each type of ectopic kidney (Horseshoe stone free - 56%, Pelvic stone free - 37.5%, Transplant stone free - none), are comparable to the other international literature.

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Extracorporeal shock wave lithotripsy monotherapy in renal pelvic ectopic

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A retrospective review to determine the efficacy of ESWL in the treatment of urinary stones in pelvic kidneys was carried out. The group included 14 male patients treated with ESWL using the Dornier HM3 lithotriptor. Twelve patients were treated in the prone position using cystoscopically placed ureteric catheters to aid in fluoroscopic localization, two patients were treated in the supine position. All pelvic kidneys were free of infection and obstruction. The mean stone burden was 30.2 ± 37.8. The majority of patients required single session (9/14), 2 patients required 2 and 2 patients required multiple sessions. The average number of shockwave (SW) per session was 1689 (range 450–3500) with average kilovoltage of 21.5 (range 18–24). Eighty-two percent of the patients followed (9/11) were stone free at 3 months. No ancillary endourological procedures were required to deal with the presenting stones. Obstructive steinstrasse complicated treatment in only 2 patients (14%). In conclusion, ESWL monotherapy of renal pelvic ectopia stones is effective and should be considered as the first therapeutic option for these patients, provided accurate localization of the stone treated and proper positioning of patients that assures adequate delivery of SW energy can be maintained.

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Extracorporeal shock wave lithotripsy for lower pole nephrolithiasis: Should we carry on?

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Complete data on 142 patients with isolated lower caliceal stone disease was analyzed to determine the efficacy of ESWL treatment. Data included information on age, sex (114 males and 28 females), obesity (40 pts.), type (primary 114 2ry to treatment of stones in other locations of the renal unit in 28 pts.), pattern (single stone in 114), side (Rt. in 59, Lt. in 83), size (Av = 12.5 mm), hydronephrosis (16 pts.), U.T. infection (11 pts.), previous intervention for stones (47 pts.) and details on ESWL treatment (including number of sessions, shockwave, Max. KV. and energy). Success was defined as stone-free status at 3 months. ESWL was successful in 56.3%. Patients with stones 10 mm or less had better results (60%) than patients with larger stones (45%) but this difference was not statistically significant. Multivariate analysis with multiple logistic regression showed 6 variables of statistical significance: Type ($P = 0.004$), side ($P = 0.002$), pattern ($P = 0.001$), previous PNL ($P = 0.001$), Max KV ($P = 0.02$) and no. of treatment sessions ($P = 0.01$). In conclusion, ESWL may be suitable for first line treatment for lower caliceal stones, however, other treatment modalities should be considered for certain groups of patients with lower caliceal stones or when ESWL treatment fails.

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Second generation shock wave lithotripsy (lithostar) in the management of primary ureteric stones *in situ*

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We reviewed our experience with in situ extra corporeal shock wave lithotripsy for primary ureteral stones in 201 patients. The Siemens Lithostar unit was used for stone disintegration and no attempts were made to manipulate the stones back to the kidney. In this study, the majority of the patients presented with upper ureteric calculi (109 patients = 54%). There were 176 male patients and 25 females ones. More than 160 patients (80%) had hydronephrosis. Double J enteral stents were used in 28 patients (14%), percutaneous nephrostomy (15%), while 130 patients (64.6%) did not need any auxiliary measures.

Details of the treatment and the results will be discussed.

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Options in the management of impacted lower ureteric stones, Security Forces Hospital experience

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Ureteric stones less than 5 mm in size will pass spontaneously in 90% of the cases. Larger stones have increasing chance to be impacted mostly in the lower ureter. Prior to ESWL and ureteroscopy, surgical removal was the only option, whether it was retroperitoneal, transvesical or rarely transvaginal. However, since 1987, ESWL and ureteroscopy were mostly utilized to manage lower impacted stones. First 150 patients were managed by ureteroscopic extraction and/or fragmentation utilizing electrohydraulic energy. Recently, we started using ESWL. Some cases which were not amenable to either techniques were handled by transurethral ureterolithotomy (65 patients). Our experience in these 3 modalities indicates that ESWL should be the first to try, if no success obtained, ureteroscopy will be the treatment of choice. Transurethral ureterolithotomy will be a viable option in case both modalities have failed.

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In situ extracorporeal shock wave lithotripsy in ureteric calculi

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Since the introduction of ESWL, Dornier HM3 at the Riyadh Armed Forces Hospital, the first in the Middle East, in January 1985 and up to August 1991, 3400 treatments were performed to treat 2150 patients with renal and ureteric calculi. 581 (27%) of these patients were with ureteric calculi, 284 upper ureteric and 297 lower ureteric (93 sacral calculi and 204 distal pelvic calculi). Patients included adults and

children with an average of 40 years, and the male to female ratio was 4:1. Of the ureteric stones 66% were primary stones, 28.5% were post-ESWL, fragments lodged in the ureteric and 5.5% were recurrent stones. The size of the stones ranged between 0.5 and 5 cm. 5.8% of all the ureteric stones were faint/lucent stones. 83% of the patients received in situ ESWL monotherapy whereas in the rest 17% per treatment ureteral stenting was used. Post-ESWL auxiliary P.C.N. tube insertion and open ureterolithotomy were performed in 2.5% and 1.5% of the followed up patient respectively. 91.5% of the patients were followed up for at least months. The main post-ESWL complications was pyrexia/sepsis which amounted to 9%. Of the patients who were followed up, 92% with lumbar ureteric calculi, 88% with sacral ureteric calculi and 93% with distal pelvic calculi were clear or stones. The overall stone clearance was 91.6% while the rest still had residual fragments of 2 mm or more. 1–2 sessions of treatment achieved 90% stone clearance of the patients who were clear of stones. It is concluded that in situ ESWL monotherapy is an effective and safe method for treating patients with ureteric calculi and should be considered as a first line method of treatment. In conjunction, with use of ureteric stents in certain situations, the stone clearance rate is definitely increased.

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Management of lower ureteric stones

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Introduction: We would like to present our experience in the management of lower ureteral stones and present a new technique transvesical ureterolithotomy.

Analysis: Over 200 cases of lower ureteric stone were treated using different modalities of treatment; ESWL, IRS (with or without U/S-electrohydrolic - Swiss Lithoclast), and open ureterolithotomy. Comparison of these technique regarding success rate, complications, hospital stay, etc.

Summary and Conclusion: URS was the best way of management. No success of "Dornier HM4" in the management of lower ureteral stone. abdomen, AU, Early intervention is better than delayed. Management of complications will be presented.

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Treatment of ureteral stones: Extracorporeal shock wave lithotripsy versus ureteroscopy

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The treatment of ureteric stones relies on insitu extracorporeal shock wave lithotripsy (ESWL) and ureteroscopy with stone extraction or fragmentation. The first 50 patients with 53 ureteric calculi to undergo ESWL (group 1) were retrospectively studied and compared to 50 patients with 50 ureteric stones treated primarily with ureteroscopy (group 2). Patient age, sex and stone size were similar in both groups. Stones were located in the lower ureter in 54.7% in group 1 and 84% in group 2.

Stone-free rate was 83% for ESWL group; 86% in lower ureteric stones, (average 2.4 session) and 96% for ureteroscopy; 100% in lower ureteric stones, (average 1.06 procedure). Four complications were observed in group 1 (1 obstruction and 3 infections) and 4 in group 2 (2 lacerations and 2 perforations).

We believe that ESWL is less invasive and provides optimal first line treatment for ureteric calculi, while ureteroscopy is more effective, particularly in the lower ureteric stones, but invasive, and should be reserved for those who failed ESWL.

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Extra corporeal shock wave lithotripsy for vesical stone

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Introduction and Aim: Vesical stones both primary and secondary are being treated by different modalities like, Cystolithotomy, Cystolitholapaxy, different varieties of lithotriptor (intracorporal). We have tried ESWL as a Primary modality in fifty patients.

Materials and Methods: 50 patients age ranging from 4 years to 92 years have been treated. 46 were male and 4 were females. The stone size ranges from 2 cm to 8 cms. 30 patients had primary stones, and 20 had secondary stones due to outlet obstruction like prostatic hypertrophy, and

stricture of the urethra. All the patients were treated with Siemens Lithostar Plus Machine. Young children were given Ketamine, and the adults were given Inj., Pethidine/Fortal as analgesics prior to the start of the procedure. 3000 to 4500 shocks were given, in the energy range from 3 to 4.5 energy sometime the procedure is repeated if needed.

Discussion: 45 patients had good fragmentation. 18 patients in primary group had very good fragmentation and they passed all the fragments easily without much disability, ten patients needed endoscopic removal of the fragments by washing under local anaesthesia, as such a very simple procedure. In the other Secondary stone group 8 patients passed all the fragments after internal Urethrotomy. Five stones did not break at all.

Conclusion and Summary: ESWL for vesical stone is a very simple and safe easy procedure and mostly carried out without any anaesthesia. It is highly successful. Practically there is no complication except retention of urine due to Urethral obst. by fragmented stone in some cases which can be treated by catheterisation and Endoscopy later. It can be carried out as a day procedure.

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Incidence of bacteremia and bacteriuria in patients with non-infection-related urinary stones undergoing extracorporeal shock wave lithotripsy

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In a prospective study, 26 patients with non-infection-related renal or ureteric stones and sterile urine were examined for evidence of bacteriuria and bacteremia following extracorporeal shock wave lithotripsy (ESWL). Blood samples for aerobic and anaerobic bacterial culture were obtained at the end of, and 1 hour after, the ESWL procedure. Urine cultures were performed 24 hours before and after treatment. Bacteremia was recorded in 7.7 per cent of patients immediately following ESWL but in no patient at 1 hour after treatment. None of the patients manifested significant bacteriuria or post-ESWL fever. These findings support the contention that, providing the urine is sterile and a negative history of past urosepsis is available, antibiotic prophylaxis is unnecessary in patients with non-infected renal stones submitted to ESWL treatment.

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Extracorporeal shock wave lithotripsy versus percutaneous nephrolithotripsy for eradication of persistent bacteriuria associated with infected stones

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Infected renal calculi are effectively pulverised by Extracorporeal shock wave lithotripsy (ESWL). However, after treatment residual fragments that may harbor bacteria and cause persistent bacteriuria remain in collecting system for months. Reports on Percutaneous nephrolithotripsy (PCNL) have shown a high rate of complete stone removal. Therefore, a prospective study was done on 64 patients mean age 54 (range 31 to 65) years with infected renal calculi. The urinary infection was localized in each patient by bilateral ureteral catheterization. Patients were treated by either ESWL and long term antibiotics afterwards (32 patients), or by PCNL aiming at complete removal of stone fragments (29 patients). Three patients were excluded as they refused referral to PCNL. Of the 11 patients with small stones (2 ± 1.8 cm) who became free of fragments at 3 months after ESWL 10 had sterile urine cultures whereas in 21 patients with larger stone (10 ± 2.7 cm) who had residual stone fragments, urine was sterile in only 4. In 29 patients treated with PCNL 27 rendered completely stone free and 28 had repeated sterile urine cultures. A positive relationship between the incidence of residual macroscopic stone fragments and the presence of persistent infection was noted. ESWL can be endorsed for treatment of small infected stones as it may result in a better outcome of patients free of stones and bacteriuria. Management of large infected stones showed more favourable results worth PCNL.

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King Fahd Military Medical Complex
9–10 November 1993

Incidence of bacteremia in extracorporeal shock wave lithotripsy

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Extracorporeal shock wave lithotripsy (ESWL) is now considered the preferred line of treatment for all types of urinary calculi. It is common practice at many centers to give prophylactic antibiotics to abolish the possible septic complications from bacteria that might be released from the disintegrated stone. In an attempt to assess the risk of bacteremia during ESWL, a total of 65 patients with 71 stones (49 renal, 21 ureteric, and 1 bladder stone) were treated using a third generation Lithotripter, Modulith SL120. None of the patients received any antibiotics before or during the treatment. Blood cultures were taken immediately before and after ESWL as well as during procedure (4 to 5 per patient).

Bacteremia appeared in two patients only after the treatment. It was therefore felt that the incidence of 2.8% is insignificant rendering the routine use of prophylactic antibiotics in ESWL unnecessary.

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Analgesia for extracorporeal shock wave lithotripsy: Initial experience with siemen lithostar-lithotriptor

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The adequacy of analgesia for E.S.W.L. was evaluated in 130 patients in ASA Class 1 or 2 in the age group of 16–60 years. Patients were randomly allocated to 4 groups. Each group received one of the following: Fentanyl and Droperidol I.V., Pethidine and Promethazine I>M>, Pethidine and Promethazine orally or no analgesics. Evaluation of patients showed that Pethidine and Promethazine orally provided a suitable condition for E.S.W.L. procedure and was superior to other methods in relieving anxiety, providing better patient conditions, good analgesia, high patient acceptability and low cost of service.

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22–23 March 1989

The effect of extracorporeal shock wave lithotripsy on hearing (RKH experience)

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ESWL has been applied widely for crushing of kidney calculi. The HM3 Dornier machine was first introduced at RKH in January 1985. The high noise levels generated from the lithotripter have caused some concern with regard to its possible hazardous effect on hearing. Patients undergoing ESWL were chosen at random from the Urology clinic and were referred to the E.N.T. Department. A full history was taken and a clinical examination made to exclude those with either previous ear disease, hearing loss, exposure to noise or ototoxic drugs. Thirty suitable cases were then referred to the Audiology Department for a pre-exposure puretone audiogram followed by two further tests, one immediately post-exposure and the second six weeks later to exclude temporary threshold shift. The noise generated by the lithotripter was measured and recorded. We concluded from the results that routine use of ESWL did not present a hazard to the patients hearing, as the degree of exposure did not exceed the OSHA standards. However, staff working on a daily basis within the lithotripsy treatment room should wear ear protection as constant exposure could induce tinnitus or lead to muffled hearing.

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22–23 March 1989

Extracorporeal shock wave lithotripsy in the rescue of retained common bile duct stone

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The growing application of laparoscopic surgery has diminished the early promise of a significant role for extracorporeal shockwave lithotripsy (ESWL) in the treatment of biliary calculi. The urological lithotripist, however, is sometimes called upon to rescue the situation of an obstructing stone in the common bile duct CBD that has been retained following conventional surgery or that has proved refractory to removal by endoscopic retrograde cholangio-pancreaticography (ERCP). We outline our experience with 10 such cases treated with Dornier HM3 ESWL at the endourology service in the King Khalid University Hospital. The series comprised 5 male and 5 female patients in the age range, 35–90 years (mean 60.1 years), all of whom presented obstructive jaundice, resolving with naso-biliary or T-tube drainage following ERCOP or surgery. All patients presented retained solitary or multiple stones in the hepatic or common bile ducts, ranging from 10 mm to 30 mm in size (mean 17.5 mm). In 1 of these, attempted ERCP extraction had resulted in the Dormia basket remaining incarcerated around the stone in the CBD. Successful stone fragmentation was achieved in 80% of cases overall, with one or more ESWL treatment sessions. Prone ESWL consistently provided 100% success in stone fragmentation, whereas patients treated in the supine position showed a 50% failure rate. Dornier HM3 ESWL has proved a valuable adjunct in management of the retained CBD stone.

Presented at the: 7th Saudi Urological Conference
Riyadh Armed Forces Hospital
11–12 November 1992

Complications of percutaneous nephrolithotripsy in more than 1000 consecutive renal stones: Prevention and management

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During the 5 consecutive years, between 1984 and 1989, 1039 renal units (1024 patients) were treated by percutaneous Nephrolithotripsy for stone disease of the kidney. A success rate of 92.7% for removal of the targeted stone(s) was achieved. A complication rate of 17.8% was reported. They included those inflicted during puncture (4%): Pelvic Tear, Bleeding, Septicaemia and Fracture guide-wire. During definitive Endoscopy (5.2%): Pelvic tear, Bleeding, Hydropneumothorax, Fractured U.S. probe, Fracture Jaw of forceps and Colonic perforation. And those during the post operative hospital stay (8.6%) bleeding and post operative Pyrexia. These complications were treated conservatively in most cases. Nephrectomy was required in one case to control aggressive bleeding. Treatment policies as well as preventive techniques will be stated.

Presented at the: 7th Saudi Urological Conference
Riyadh Armed Forces Hospital
11–12 November 1992

Percutaneous nephrolithotomy for calculi in horseshoe kidney

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Between 1988 and 1996, nine patients underwent percutaneous nephrolithotomy at the Health Sciences Center for calculi in horseshoe kidneys. A single percutaneous nephrostomy was used in five patients. Antegrade techniques were used to establish the nephrostomy tract in six patients, and retrograde techniques in three patients. Preoperative CT scan was performed in all patients and showed a potential risk of bowel injury in three patients. In situ disintegration with ultrasound and/or electrohydraulic lithotripsy was necessary in all patients. All patients required rigid nephroscopy and in eight patients, flexible nephroscopy was necessary to achieve optimal stone removal. Second-look percutaneous nephrolithotomy was necessary in three patients. A total of eight patients (88.9%) were rendered stone free with percutaneous nephrolithotomy alone. One patient was left with a 4 mm asymptomatic stone fragment. We conclude that percutaneous nephrolithotomy is an acceptable treatment for calculi in horseshoe kidneys. Multiple percutaneous access sites, use of flexible nephroscopy and second-look procedures are frequently required to achieve satisfactory stone-free rate.

Presented at the: 10th Saudi Urology Conference
King Fahad National Guard Hospital
26–28 November 1996

Uretroscopic treatment of ureteral, stones in King Hussein Medical Center

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78 patients with ureteral calculi, or suspected stone obstruction were treated by ureteroscopy using rigid ureteroscope during the last two years.

Of the total number, 58 patients have had lower ureteric stones, 17 middle ureteric, and 3 upper ureteric stones.

After ureteric endoscopy 66 patients (85%) became stone free, either immediately or later on. 8 procedures failed (10%) due to different reasons. And in 4 cases (5%) the stones were pushed to the kidney and treated later on by ESWL.

We believe that ureteroscopy is one of the effective modalities for treatment of the ureteric stones especially the lower ones.

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22–23 March 1989

Ureteroscopies in Bahrain Defence Force Hospital - September 1987 to December 1988

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72 Ureteroscopies were performed during Sept 87 to Dec 88 in our Unit. Proportion 59 males and 19 females. The ratio is 2.7:1 and the age range was 20–61 and the average was 39.6 years.

The majority were Bahrainis and others wide-spread nationalities. Our indications: 65 lower ureteric stone, 10 post ESWL stein strasse, 4 push and bang and 1 because of ureteric stone with calyceal extravasation, 3 cases were stricture ureter, 1 tumour and 3 for diagnostic ureteroscopy. The incidence were almost equal in the right and left. The site of the stones more in the lower third than upper third (lower third 62 cases and upper 3 cases). Out of the 72, 20 only had ureteric dilatation and the remaining was ureteroscopy without dilatation or uretromate. Mode of stone extraction either by forceps, dormia or ultrasonic lithotripsy. Out of the 72 patients 54 and ureteric splints left behind; number of days with splint is 1.9 (average).

50 of our ureteroscopies were covered by pre-operative antibiotics in the form of Keflin and/or a Gentamycin 1 shot during induction of anaesthesia.

Our complications - 2 developed hematuria which subsided with time, 1 - post operative urinary tract infection, 4 had residual calculi (which removed later) and 1 case of performation and extravasation which leaded re-implantation.

We think ureteroscopy is an excellent way for dealing with lower or pelvic ureteric stones keeping in mind the availability of other modalities such as shock wave as well as ultrasonic lithotripsy. We tried to avoid ureteric dilatation as much as possible because we think it has its own morbidity and complications.

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King Fahd Military Medical Complex
22–23 March 1989

Ureteroscopy for stone ureter experience in Sabah Hospital

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A study of our initial 92 cases of ureteroscopy using the rigid ureterorenoscope was performed. Of the first 24 stones manipulation attempted 16 cases were successful (60%). With the later 68 cases 51 were successful (75% success rate). Stone sizes varied between 1/2 cm to 2 cm. They were removed with flexible ureteric stone forceps when small, or disintegrated with U/S or electrohydraulic probe when large.

It was found easier to perform ureteroscopy for bilharzial ureter with stone and the success rate was higher than in cases of nonbilharzial ureter.

Many cases of stones in the bilharzial ureters were associated with lower ureteric strictures. Concomitant treatment of the strictures by dilatation through ureteric bougies minimized the need for the reimplantation which became a less carried out procedure after ureteroscopy started.

The direct visual approach to ureter has distinct advantages over blind ureteric manipulation which is more hazardous.

The majority of patients were discharged in the second post-operative day.

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King Fahd Military Medical Complex
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Hydraulic-aided ureteroscopy: Impact on results

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Although transurethral ureteroscopy has emerged as a valuable endourological tool in the treatment of stone, our initial experience reflected the difficulties and complications widely reported by others.

The introduction of hydraulic-aided instrumentation (Ureteromat-Storz GmbH), as an alternative to preparatory bougie dilatation, has had a favourable impact on results, both in reducing the rate of complications and the operating time and, also, in improving the efficacy of the technique in regard to treatment of ureteral stone. We report on the comparative results noted in two series of patients with ureteral stone treated with either technique.

In our initial series of 109 patients submitted to ureteroscopy for ureteric stone, the primary goad was successfully achieved in 86.2%. In 14 cases (12.2%), an injury to the ureteric wall was recorded and, in 11 cases (10.1%) open surgery was proceeded to, either immediately or at a later date on account of stricture. The mean operating time was 72.5 minutes, with 39.4% of cases requiring time in excess of 60 minutes.

In a subsequent series of 118 cases of ureteric stone, success was recorded in 96.6%, and only 2 cases (1.6%) showed mural injury. One of these subsequently required open surgery on account of the development of stricture at the site of injury. Mean operating time in the series was reduced to 21 minutes, with only 3.9% of all cases requiring time in excess of 60 minutes.

The use of controlled high pressure irrigation obviates the need for preparatory dilatation of the ureter with bougies, thus reducing the rate of complications associated with the latter. Providing that care is exercised in adjusting flow rates during the procedure, there are seemingly no ill effects on the function of the treated renal unit.

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King Fahd Military Medical Complex
22–23 March 1989

Ureteroscopic extraction of ureteric stone experience in a peripheral hospital

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Twenty seven patients underwent ureteroscopic extraction of ureteric stones with a success rate of 63%. The average hospital stay was 2.4 days. Several minor and major complications were encountered during the initial stages. Including perforation that occurred in 11.1% of patients.

The procedure appears more suitable for stones in lower 1/3 ureter than in middle or upper 1/3 of ureter. Ultrasonic disintegration of stone failed in all the four patients it was tried on. Electrohydrolic lithotripsy is considered a better choice.

Success rate improves as one gets more experience and with the current generation of ureteroscopes which are shorter and easier to handle.

The post-operative recovery is smoother with a ureteric splint than without.

Presented at the: 5th Saudi Urological Conference
King Fahd Military Medical Complex
22–23 March 1989

Percutaneous cystolithotripsy

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A new approach for the management of urinary bladder stones in young children in Saudi Arabia.

First case treated with this technique on December 17, 1989. A total of five cases treated in the same procedure from December 1989 to July 1990 at "Al-Shaty Hospital," Jeddah (MOH).

Abstract will explain the procedure and it's advantages in young children compared to open cystolithotomy and transurethral cystolithotripsy.

Presented at the: 6th Saudi Urological Conference
National Guard King Khalid Hospital, Jeddah
27–28 November 1991

Pulsed dye laser for treatment of ureteral and bladder stones

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A total number of 25 patients of ureteral and bladder stones have been treated primarily with Pulsed Dye Laser. A success rate of 92% in ureteral stones and 100% in bladder stones. In this presentation we will demonstrate end results, principle of laser, advantages of laser in comparison to other options of stones fragmentation.

Presented at the: 8th Saudi Urological Conference
King Fahd Military Medical Complex
9–10 November 1993

Double "J" silicon stent - A word of caution in urological practice, our experience

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Double "J" silicon stenting is an integral part of modern urological practice applied both endoscopically and after open surgery in cases varying from obstructive uropathy, bilharziasis, tuberculosis of renal tract, post operatively after wide ranging procedures like ureterolysis, pyeloplasty, ureteroneocystostomy, ureteroplasty, etc. It is easy to put and remove endoscopically. Recommend duration to keep a stent is few weeks to eight weeks in usual practice (Blandy 1986) although some keep it 3 months.

In our experience at King Fahd Central Hospital, Gizan, over a period of 3 years of 52 cases, ranging all above operations and after P.C.N.L. and Ureteroscopies, etc., interesting observations were made. Two cases formed stones around catheter within 8 weeks, one requiring open surgery to remove the stent. One other case ignored follow-up, reported after one year, and had calcified double "J" stent, requiring open operation to remove it. Rest had normal endoscopic removal, although many had (12) phosphate encrustation.

We recommend, safe period to keep a stent or changing interval as 4–6 weeks, strictly to avoid complication, especially caution in cases with stone forming tendency and strict follow up instruction is mandatory.

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National Guard King Khalid Hospital, Jeddah
27–28 November 1991

Management of incrustation of indwelling internal ureteral stents

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Incrustation of indwelling internal ureteral stents has been identified as a risk factor. Four patients with Double-J of the stent developed incrustation at the lower J of the stent and two had incrustation at both ends. The upper J incrustation disintegrated with extracorporeal shock wave lithotripsy. The lower end incrustation treated with cystoscopic electrohydrolic lithotripsy. We believe that extracorporeal shock wave lithotripsy is an effective method for the treatment of incrustation of the upper J of the internal ureteral stents and recommend regular follow up and early removal of indwelling ureteral stents.

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National Guard King Khalid Hospital, Jeddah
27–28 November 1991

Vesico-ureteral reflux in patients with double-J stents

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A prospective study of 30 renal units in 27 patients with double-J stents seen at our hospital was carried out. The aim of the study was to confirm or rule out the occurrence of vesico-ureteral reflux radiologically and to define it's degree in stented patients. During the filling phase of the cystourethrogram, reflux occurred in 19 out of the 30 renal units (63%). Of those 19, the reflux was of grade 1/4 in 15 (79%), while it was of higher grades of 2-3/4 in 4 (21%) renal units only. During the voiding phase of cystourethrogram, reflux was observed in 24 units out of the 30 i.e. 80%. Of those 24 units, the reflux was of the high grades of 2-4/4 in 20 (83%), while it was of the low grade of 1/4 in 4 (17%). In the presence of double-J stents the ureteral peristaltic waves were sluggish and averaged 1/2 waves per minute in 15 patients observed fluoroscopically for one minute after voiding. We conclude that in the majority of patients with double-J stents vesico-ureteric reflux occurs in low grade during vesical filling and high grades during voiding and that stents adversely affect the ureteral peristaltic activities.

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National Guard King Khalid Hospital, Jeddah
27–28 November 1991

Double pig tail stents associated bacteriuria

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In spite of the benefits of double pig tail catheters to the Urologists it has been reported to be associated with actual and potential complications.

233 patients with double pig tail stents were retrospectively evaluated to determine the percentage of bacteriuria and infected catheters. There were 184 male and 39 female patients ranging in age from 2 to 78. 56 patients have positive urine culture on the day of the catheter removal. Of 158 patients who had their catheters cultured, 111 were positive for microorganisms while 47 catheters were sterile. The relationship of infected catheters to age, sex, duration of catheterisation, type of catheters and method of insertion will be discussed.

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Can real-time ultrasonography replace intravenous urography in the diagnostic evaluation of renal colic?

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Ultrasonography of the urinary tract was performed in 46 patients with renal colic. Of these 64 patients, the presence of urinary calculi was documented in 58 patients (true positives). In the remaining 6 patients (true negatives), no calculi were found in the collecting system. Our data showed that in patients with renal colic ultrasonography can demonstrate on the symptomatic side hydronephrosis with 89.7% sensitivity and 83.3% specificity, ureterectasis with 79.3% sensitivity and 83.3% specificity, urinary calculi with 77.6% sensitivity and 83.3% specificity. However, combining all criteria together ultrasonography achieved 96.6% sensitivity and 83.3% specificity with 95.3% diagnostic accuracy in detecting, locating and visualizing the obstructive calculus. In our study there were two false-negative and one false-positive diagnoses. Our data demonstrated that ultrasonography offers a viable alternative to the intravenous urogram in the initial evaluation of patients with renal colic. Intravenous urography should be reserved for the patients in whom the clinical situation strongly suggests renal colic and the ultra sound examination is negative.

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22–23 March 1989

Imaging in renal colic

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Primary management of Acute Renal Colic remains in the domain of a plain film followed by an IVU at the time of renal colic.

Injudicious use Ultrasound as a primary investigative modality as practiced by some will miss ureteric calculi in a significant number of patients in whom calculi are not associated with hydronephrosis.

Ultrasound will also miss small calculi that do not shadow well in the pelvicalyceal systems.

Methods: Plain Film, IVU - 10 minutes film.

Results: A normal IVU at 10 minutes films conducively excludes renal calculi, allowing the Clinician to look elsewhere for the cause of apparent renal colic.

Conclusion: Conventional plain film followed by IVU done at the time of renal colic remain the mainstay of renal colic investigation. Ultrasound should be avoided as a primary investigation, unless IVU facilities are not available.

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9–10 November 1993

Extracrporeal shock wave lithotripsy for urolithiasis: Experience with 1500 patients

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The advent of endourology and extracorporeal shock wave lithotripsy (ESWL) has radically changed the current therapeutic spectrum for urolithiasis. ESWL is presently the treatment of choice for the vast majority of patients with urinary calculus disease.

We report our experience in treating 1,500 patients with urolithiasis by administering shock wave therapy on the Siemen's Lithostar. There were 617 patients with ureteric calculi and 46 vesical stones. The size of the calculus varied from 4 to 115 mm in the largest dimension. Fifty-two patients had co-existing congenital anomalies of the upper urinary tract, 46 had a solitary kidney and 29 had varying levels of renal insufficiency. We treated 96.6% of the patients under intravenous sedation. Pre ESWL auxiliary procedures were

essential in 95.2% with JJ ureteral stening in 1,406 patients. The rate for major complication was 0.4% we have recorded an average of 6 month stone free rate 84.6%

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24–26 February 1998 (27–29 Shawwal 1418)

Preliminary results of initial experience with the Egyptian Lithotripter Imhotep-1

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In the Urology Department, Cairo University, an ongoing study was started in June 1997 to evaluate the efficiency of the first Egyptian Lithortripter Imhotep-1 in the treatment of urinary calculi on an outpatient basis. The components of the machine are a straight table suitable for endoscopic interventions, a 400–1000 bars electrohydrolic generator, a C-arm X-ray localization system (0 and 30 degree) and an ellipsoid reflector with a diameter 14.6cm and a focal depth 127 mm. The coupling unit is a soft water cushion. The overall treatment sessions/patient were 1.73 with a kv ranging between 7.5 and 9.5 kv. Treatments were anaesthesia and analgesia free.

The initial number of patients was 26; 15 male with an age range of 23–60 years, and females with an age range of 26–53 years. There were 21 patient with renal calculi and t with ureteral calculi. Stone size range between 8 × 9 to 18 × 24 mm. Two patients were lost to follow up so that the result of treatment in the remaining 24 will be reported. Satisfactory fragmentation was achieved in 16 patients. These patients received an average of 1.3 sessions/patient, and on follow up, 12 were free of fragments, 4 had insignificant fragments. Fragmentation was deemed incomplete in 7 patients, while no change was seen in 3 patients. Treatment results are comparable to other machines available in the market, the study will be presented in more detail.

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Retrograde nephrostomy access technique for percutaneous nephrolithotomy and endopyelotomy

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Purpose: One of the most technically demanding aspects of percutaneous nephrolithotomy is the establishment of a nephrostomy tract into an appropriate calyx, often in an undilated collecting system. We present our experience with the retrograde technique for establishing a percutaneous nephrostomy tract.

Materials and Methods: In January 1997, we started the Retrograde Nephrostomy Access Technique for Percutaneous Nephrolithotomy and Endopyelotomy in Saudi Aramco Institution. 23 patients underwent this technique.

Results: All but two of the attempts were successful. The two failure cases occurred in the early period of our experience underwent an antegrade nephrostomy access by the Urologist in the same set. Lawson Retrograde Technique used in 16 patients and the Hawkins-Hunter Retrograde Techniq used in 5 patients (those patients had initially failed Lawson Retrograde Technique). Time average for the retrograde nephrostomy access was 15.3 minutes Lawson Technique and 20 minutes for the Hawkins-Hunter Technique. Mean fluoroscopy time was 3.2 minutes. Access site: 6 patients with upper calyx access, 15 patients with middle calyx access and 3 patients with lower calyx access (one patient needed two accesses). No patient developed any complications related to the retrograde nephrostomy access, and no case cancelled because of difficulty in establishing an access.

Conclusion: The establishment of a nephrostomy tract using the retrograde technique offers advantage over the antegrade technique. Radiation exposure is significantly minimized with retrograde access technique.

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EFfect of magnesium citrate on renal stone fragmentation and clearance during and after extracorporeal shock wave lithotripsytreatment

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Objective: To study the effect of oral administration of Magnesium Citrate on the degree of renal stone fragmentation and the clearance during and after treatment by high pressure, second generation ESWL machine (Siemens Lithostar-2, C system).

Study Design: A prospective controlled study, 57 randomly chosen patients with renal stone(s) scheduled for ESWL were given Mg citrate orally. The duration of treatment ranged from 7 to 30 days or more to ensure urinary excretion of the chemical compound. The control group comprised 73 patients with matched demographic data, who did not receive Mg citrate.

Methodology – (a) Treatment Group: All routine work up for ESWL treatment was done. On the day of booking Mg citrate sachets t.d.s. with meals was prescribed. On the day of ESWL: (1) Medication history was taken from the patient to ensure that the medication was taken for the intended period of time (at least 1–2 weeks). (2) Two urine samples were taken before ESWL, one for routine urine analysis including pH and crystalluria and the other one was tested for Magnesium, Oxalate, Calcium and Citrate concentrations. (3) The patients were asked to bring stone particles for stone analysis. The routine follow up for ESWL was carried out. (b) No treatment (Control Group) Patients: Same as the above except that they did not receive Mg Citrate or any other Citrate medications. It was important to take a proper drug history before ESWL from these patients. The same set of investigations and follow up were carried out.

Results: There were slight differences in stone clearance in the post-ESWL short term follow up period but significant changes in urinary chemistry towards inhibition of crystalluria and increase in the citrate excretion.

Conclusion: Oral Magnesium Citrate combining two crystallization inhibitory compounds is probably a beneficiary drug in long-term use.

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A cost effective emergency dignosis plan for urinary stone patients presenting with ureteric colic

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Objective: To develop a cost effective plan for the accurate diagnosis of urinary stone patients presenting with ureteric colic based on an assortment of investigations which are less invasive and more economical than IVU.

Patients and Methods: 143 consecutive emergency patients presenting with ureteric colic were admitted to hospital and prospectively studied by history recording, physical examination, laboratory tests and imaging procedures according to a preset format. Significant association of the final diagnosis of urinary stones (which was made by actual stone retrieval) with various diagnostic of urinary stones (which was made by actual stone retrieval) with various diagnostic variable obtained from the results of investigation was statistically studied using bivariate correlation and multivariate logistic regression analysis. Algorithms for reaching an accurate diagnosis of urinary tract stones was formulated using the most significant diagnostic variables and the accuracy of each of those plans was compared with that of emergency IVU.

Results: 18 patients were excluded for various reasons. Of the remaining 125 patients 82 (66%) were confirmed to have urinary stones. Findings associated with eventual stone retrieval in a descending order of significance were: Calcusonographic features, radio-opacities on KUB and micro-haematuria. Based on these findings two algorithms could be formulated to reach as accurate a diagnosis as possible. Algorithm "A" in which in initial ultrasound is mandatory has a sensitivity of 89% a specificity of 88%, and an overall accuracy of 88% for urinary stone detection compared with 91%, 77% and 86% respectively for algorithm "B" in which ultrasonography was employed selectively after initial KUB and urinalysis for microhaematuria. This compares with 94%, 79% and 89% respectively for IVU.

Conclusion: Both plans are viable alternatives, which could replace routine emergency IVU.

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Extracorporeal shock wave lithotripsy for ureterolithiasis in bilharzial urinary system: Efficacy and variables that influence treatment outcome

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Objective: Schistosomiasis affecting the ureter is commonly associated with factors that can influence extracorporeal shock wave lithotripsy (ESWL) results namely: ureteric stricture disease and hydroureter. We evaluate the results of ESWL in the treatment of urinary stones in bilharzial ureters and try to identify variables that influence the treatment outcome.

Patients and Methods: Forty-eight ureters with stones in 43 patients with urinary schistosomiasis were reviewed. All patients were treated with the Dornier HM3 lithotripter. Data included characteristics of patients and ureteric stones, manifestations of urinary tract schistosomiasis and details of ESWL treatment.

Results: Thirty-five patients (81.3%) were stone free following ESWL treatment. Only 3 patients required ancillary ureteroscopic manipulation to render them stone free. Multivariate analysis and logistic regression identified 2 significant variables that determined treatment outcome namely: the presence of ureteric stricture ($P = 0.004$) and the ESWL voltage ($P = 0.003$). Ten ureteric stricture were encountered in 9 patients (21%), the majority of these were diagnosed post ESWL when patients failed to pass well-fragmented stones.

Conclusions: In situ ESWL appears to be a safe and effective first line of treatment for urinary stones in bilharzial ureters. The presence of concomitant bilharzial stricture significant variable affecting the treatment outcome. Every effort should be make to rule out and deal with possible complicating factors such as ureteric strictures in the pre treatment period. Close follow up post ESWL treatment is mandatory to identify patients that might require further endourological intervention.

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23–25 February 1999 (7–9 Dhu Al Qa'dah 1419)

The experience of King Abdulaziz University Hospital in the treatment of urinary calculiusing the Dornier Doli u/50 lithotripter

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We present our data and results of ESWL treatment of 476 urinary stones in 374 patients treated over a period of 20 months. The series consisted of 279 males and females (ratio 3:1). The age ranged from 10 to 90 years (mean of 43 years). The stones were renal in 359 (75.4%) ureteric in 110 (23.1%) vesical in 7 (1.5%). Of the patients 272 (73%) had a solitary stones, while 102 (27%) had more than one stone. A total of 794 ESWL sessions were given to those patients. For those patients with solitary stones 1.2 sessions were given (342/372) while for patients with multiple stones, 2.2 sessions were given (452/204). ESWL treatment was conducted using the third generation Dornier Doli U/50 device utilizing an electromagnetic shockwave emitting technique and a precise narrow focal area. In this device, the availability of both ultrasonography (US) and x-ray imaging facilities allowed quick and accurate stone localization but we used US only in 87% of renal stones and x-ray for the rest and for all of the ureteric and bladder stones. Details of the patient's data, sites and sizes of the stones, technical treatment data and the 3-months stone-clearance rate using this device will be presented.

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Comparison of the efficacy of HM3 and MFL5000 lithotropter in the treatment of renal stones

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Between June 1994 and June 1995, 176 patients with renal calculi were treated at Riyadh Armed Forces Hospital with Dornier HM3 and MFL5000. Those patients with opaque renal stones sized 5–20 mm were selected for comparison. 104 patients were treated with HM3, 72 patients with MFL5000. Their mean age was 50 years and their weight were 63 kg. The stones were located in the calcies in 67% (118) and in renal pelvis in 32.9% (58). Localization of stones was by ultrasound or x-ray screening HM3 patients received GA and only analgesia for those treated by MFL5000. Auxiliary procedures were performed in 2 patients (1 PCN, 1 DJ). Follow up after 3/12 showed stone free rate after 1 of 11 treatments by HM3 was 95.65 and 92% in MFL5000 and the number of repeated treatment ratio is 1.25 for HM3 and 1.3 for MFL5000.

Since our results shows that the efficacy of HM3 and MFL5000 in renal stones clearance are comparable, we conclude that MFL5000 anesthesia free should be the first choice for treating renal stones with size up to 20 mm.

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Preliminary results of Egyptian (MT-1R) lithotripter on renal stones

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During one-year period (1996–1997), patients having urinary stone (130 renal, 69 ureteric and 3 bladder) were treated at El heal (Red Crescent) Hospital using an Egyptian designed electro-hydraulic shock wave lithotripter (MT-1R) Mobi Trip 1st Rotating Reflector.

We report our clinical results and follow up of one year duration, patients' age ranged from 18 to 60 years with an average –39 years. Cases received general anaesthesia without intubation, in patient with renal stones, the stone size ranged from 5 mm to 40 mm with an average 24 mm while ureteric stones ranged from 5 mm to 25 mm with an average 12 mm and average bladder stone size 16 mm.

In groups of patients with renal stones, there were 28 out of 130 patients with multipler renal stone with an average size 27 mm.

End result of treatment included stone clearance in 105 out of 130 patients with renal stones received only one session with average. 2850 shock waves at power 18kv with clearance success rate was 80%; 25 out 130 patients received 2 sessions with clearance success rate 96%; the remaining one patient cleared after the third session clearance in patients with ureteric stones after the 1st session encountered in 54 out of 69 patients with average 3000 shock waves with clearance success rate of 80% while the remaining 3 patients cleared after 3 sessions.

All patients with bladder stones were cleared from the first session with successes rate 100%.

These preliminary results reflect early experience with (MT-1R) lithotripter and further clinical results and follow up will be reported with treatment of large number of cases.

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Treatment of cystine stones: Experience in 15 patients

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Cystine stone represent 1% to 2% of urinary calculi, modalities of treatment for cysteine calculi are chemolysis, ESWL, endoscopy, open surgical removal, or combination of two or more modalities with variable results.

We studied 1245 patients with urinary calculi in the period from July 1987 to December 1997, 15 patients confirmed to have cysteine stones (5 females and 10 males, 3 to 53 years old). There were 48 stones, 22 (46%) renal and 26 (54%) ureteric. The stone size ranged from 5 to 45 mm in the longest diameter. Analysis was available in 40 stone 19 pure cysteine and 21 mixed with other types of crystals.

ESWL performed as initial treatment for 16 renal stones (<30 mm) with success in 8. Percutaneous nephrolithtripsy (PCNL) performed in treatment of 10 stones, 3 of those needed further chemolysis of ESWL. One patient with single renal stone responded to medical treatment. Three stones required pyelolithotomy.

Of the 26 ureteric stones, 3 passed spontaneously after decompression with percutaneous nephrostomy catheters, 2 impacted upper ureteric stones treated by ureterolithotomy and 21 stones initially treated by ESWL, and 3 were adequately disintegrated. Those 18 stones that failed ESWL were extracted by ureteroscopy.

We believe that renal cysteine stones could be treated effectively by ESWL, PCNL or combination of both, while ureteroscopy is more effective in treatment of ureteric cysteine stones. Alkalinization of urine should be used with caution in patients with cysteine stones.

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Are we doing it right? Lithotripsy versus stone management

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This is a review of stone management in the Eastern Province of Saudi Arabia based on statistics of certain hospitals as well as questionnaires completed by treating physicians in these hospitals.

Extracorporeal Shockwave Lithotripsy (ESWL) was introduced in the Eastern Province in 1988. Between 1988 and 1990 three devices in two (2) Government Hospitals and one (1) Private Hospital were installed and used to serve the area of the Eastern Province and continued to do so for another four years. Since 1994 more devices have been introduced and now total ten (10), installed in different hospitals in the region. On the other hand the diffusion of percutaneous nephron-lithotripsy techniques continued to be limited to only three (3) hospitals and ureteroscopy is performed in a limited number of hospitals.

The medical management and prevention of urolithiasis is still not very well developed in all the hospitals and the only method of stones analysis was until a few months ago the chemical analysis.

The study indicates that there is a need to revise the Healtcare Policy in the Eastern Province and Urologists concerned with lithotripsy should voice clear recommendations about it.

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Urine pH and crystalluria variation in stone formers and healthy individuals

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Introduction: The normal individual shows variation in urine pH, resulting from postprandial alkaline tides that takes the pH well above 6.5. The mean pH of urine in patients with uric acid stones is 5.5 $\pm$ 0.4 compared to 6.0 $\pm$ 0.4 in calcium oxalate stone patients and >7.2 struvite stone formers.

Objectives: To find out the urine pH and crystalluria variation in healthy and stone former patients.

Method: A prospective controlled study of 1,257 stone formers compared to a control group of 1,064 healthy young adult males. A simple urine analysis for pH and crystals was performed for both groups.

Results: Acidic urine was reported in 46.3% and 50.8% in controls and stone formers respectively. Alkaline urine was found in 5.7% in controls compared to 15.4% in the stone formers. The incidence of crystalluria in the stone formers was higher in acidic and alkaline urine (58.1% and 17.2%) than controls (46.8% and 14.3%) and higher in controls (39%) than stone formers (24.7%) with neutral urine.

In the acidic urine 62.7% of the calcium oxalate crystals were found in the stone formers compared to 58.2% in the control and 69.9% of the crystals in the stone formers compared to 44% in the control. In the alkaline urine 41.5% of the phosphate crystals were found in the stone formers compared to 100% of the control. In the alkaline urine 72.2% of the cysteine crystals were found in the stone former while no cystinuria was reported in the controls.

The most common type of crystalluria was calcium oxalate (53.9% and 55.8% in stone formers and controls respectively), followed by urate (26.9% and 32.4% in stone formers and controls respectively) with more incidence acidic urine. The phosphaturia was nearly the same in both groups and more in alkaline urine.

Conclusion: Acidic urine could be a risk factor for stone formation although in could still be present in healthy individuals, whilst alkaline urine is a higher indicator for stone formation. The presence of crystalluria could be an indicator for stone formation, while cystinuria is the only strong indicator of stone incidence.

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7–9 May 2002 (24–26 Safar 1423)

Upper calyx access percutaneous nephrostomy and endopyelotomy

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Purpose: To review the feasibility of nephrostomy access through the upper calyx in difficult kidney stones and obstruction.

Materials and Methods: Nine Patients had the nephrostomy access through the upper calyx. The retrograde nephrostomy access technique was used in all patients. With the anesthesia coordination, the access passed retrogradely through the upper calyx, while the lung is inflated.

Results: None of the patients developed lung or plural injury. Follow up chest x-ray was normal. No blood transfusion needed.

Conclusion: Upper calyx access can be achieved with low risk of injury in cases where the middle and lower calyx are not appropriate. Retrograde technique could achieve an access through the upper calyx safely comparable to the antegrade technique.

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Self retaining ureteric stent as initial therapy for ureteric stone management

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Objective: To determine the value of Double Pigtail ureteric stent as initial therapy for ureteric stone management.

Patients and Methods: We reviewed the records of 43 patients with 47 ureteric stones treated at our hospital over 22 months. 32% (15 stones) in the upper, 13% (6 stones) in the middle, and 55% (26 stones) in the lower ureter. 43% (20 stones) were <5 mm, 38% (18 stones) 5–8 mm, and 19% (9 stones) >8 mm in diameter. We adopted a policy of Double Pigtail stent insertion as initial treatment for all patients who need surgical intervention. Stent was inserted in 70% (34 stones), 8 stones passed with stent in situ, and 21 patients with 25 stones were either sent for ESWL treatment or have ureteroscopic stone removal two weeks later, using 9.5 F rigid ureteroscope and ultrasound lithotripsy or Domia basket. Patients were followed up at 1 and 3 months with KUB, US or IVU as indicated.

Results: 34% (16 stones) passed, 8 passed spontaneously without stent and 8 with stent in situ. Ureteroscopic stone removal successfully done for 37% (17 stones), without complications or technical difficulty in stented dilated ureter with 100% success rate. Ureterotomy for 6% (3 stones) at the vesicoureteric junction, and 8 of 10 patients had successful ESWL treatment with 80% success rate often in more than one session. 2 patients had open surgery for large impacted mid ureteric stones. Hospital stay was significantly less in the stent group 2.7 days compared with 3.7 days without stent. We achieved over all 98% stone free rate at 3 months, without significant morbidity related to the stent or endoscopic procedures.

Conclusion: Ureteroscopy could be considered as an ideal treatment for ureteric stone where ESWL facility is not readily available. Initial ureteric stent insertion in addition of diverting the urinary flow, it dilates the ureter, facilities the subsequent ureteroscopy, improves the success rate for stone removal and may reduce the hospital stay, cost and morbidity related to ureteroscopy.

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Urolithiasis in the Arab world: A review and an outlook into the future

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Urolithiasis is a prevalent diseases in the Arab World. It affects all ages (a peak incidence between 30 and 50 years), and both sexes in a ratio of M:F = 4:1. It constitutes a great health hazard because of its associated morbidity, the possible damage it may inflict to the kidneys and the big socio-economic burden on the population especially so with the high cost of the modern methods of its management and treatment.

This review, though for from being complete and comprehensive, discusses the epidemiology of urinary calculus disease in different Arab countries, its symptomatology, related biochemical and metabolic profiles and a comparison of different methods and procedures used in its management and their results compared to published reports from the Western literature.

Calcium oxalate (Ca Ox) as expected, is the major component (50–70%) of stones reported and cysteine is the least common (1–2%).

Aetiologically no significant metabolic or endocrine abnormalities are noted. However, diet, the climate and the

changes in the life-style of many Arab countries especially the Gulf States and Saudi Arabia together with some genetic predisposition (cysteine stone) may play a role. The majority of stones were treated with ESWL or with ureteroscopy together with auxillary procedures – PCNL and JJ stents on OPD basis or with minimal hospital stay. The results are very encouraging and compare well with published reports from the Western World. The review concludes with some suggestions related to this disease.

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Urolithiasis, the Saudi perspective

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Introduction: Urinary stones is a well-known disease in the Middle East since long time ago, although no definite description was mentioned in the pre-historic Egyptian writings. Stones were discovered in the urinary bladder of a mummified child by Elliot Smith in 1901 in a tomb at El-Amrah, near Abydos. This was clear proof of the existence of the disease in this region.

Islamic scholars such as Abulcasis (Abu Al Kasim) Al Zahrawi and Al Razi and others who lived during the period 600–1200 AD gave full description of urinary stones in the kidney and ureter and urinary bladder with details of its presentation and management including surgical procedures on urinary bladder stones.

The Arab Peninsula is a large are of the Middle East extending from Syria in the North to Yemen in the South with diversity of cultures and difference in climate and temperature ranging from 0˚ in the North in winter and reaching 50˚ in some parts of the region in the summer. Most of the regions are desert. Saudi Arabia, which constitutes the major part of the Arab Peninsula, experienced rapid cultural changes with the effect of Western Civilisation developing large multicultural cities, thus creating wide migrations from the South and North mostly to the Western, Middle and Eastern regions.

Since about five decades Saudi Arabia introduced western medicine in most of the regions with modern hospitals and advanced management facilities, creating a good opportunity and accessibility for all the citizens to enjoy medical treatment free of change. Since about two decades many physicians have interested themselves in the urolithiasis problem and run clinical studies on the different aspects of that diseases.

Clinical Studies: We are intending in this review to present analysis of the available studies on this disease, which are mostly from the Middle and Western region Abdulhalim reported on a clinical study of 512 stones patients followed in the stone clinic. All of his was done in the Western Province of Saudi Arabia and a control group of 170 subjects and will be referred to as Study 1. Data collection and analysis of 1257 patients treated for stone diseases from the eastern region were reported for the first time, of which 200 patients had extensive dietary and biochemical analysis. We also included a review of urine analysis from 1060 non-stone former Military Cadets. This will be referred to as Study 2.

The review also included edited abstracts from the Saudi Urological Conferences (1983–1996) by Abomelha and Fallatah, as well as comparisons of results with the reported data from different international studies.

Study 1: Dr. Abdel-Halim *et al*. has reviewed the data sheets in stone clinics of 512 patients, which included bio-data and diet as well as biochemistry and stone analysis. The patient age range was from 1 to 80 with a mean of 39.15. The male to female ratio was 3:9:1. Loin pain was the commonest presenting symptoms, whilst burning micturition was the second, with haematuria the commonest presenting symptom in the age group below 15 years. Fresh urine samples were examined from 140 patients showing calcium oxalate crystalluria in 9.3%. No uric acid crystals were detected. A 24-hour urine analysis was studied in 115 patients. The total volume of urea was <200 ml/24 hours in 63.5% with a mean total volume of 1888.30 ml. 38% had acidic urine with pH range (5–5.4) with mean value of 5.2 while in control group 26.9% had acidic urine with a mean of 5.2 also. Hyperuricosurea was found in 12.7% which was less than in control group where with a value of less than 100 mg/24 hours was noted in 18.2%, which is much higher than the control were only 3 cases out of 23 subject had marked hypocitrate urea. Serum uric acid was elevated in 12.5% of the stone former and the entire control group was within the normal hospital range. Stone analysis was performed on stones from 512 patients. 112 stones (21.8%) was pure or high content of uric acid or urate. Oxalate was identified in 305 (59.5%) of the stones, and 95 (18.6%) was phosphate stones.

Study 2: The 1257 patients included in this review were from the Eastern Province region who underwent treatment for renal stones and would be analysed and reported for the first time. The patients were referred from different medical centers to the King Fahd Military Medical Complex in Dhahran for treatment of Urolithiasis between 1988 and 1998 after confirming the diagnosis of urinary stones. Male to female ratio was 3:3:1 with age range from 3 to 82 years (mean 40.81:13.34). The clinical work up included urine analysis and culture, 24-hour urine analysis blood chemistry, radiological evaluation and wet chemical stone analysis. Ultrasond and IVU were performed on all patients and revealed no obstruction in 39.5%, while 139 patients (13.2%) had marked obstruction. 265 patients (25.2%) had moderate obstruction and 204 patients (19.4%) had mild obstruction. The stone position was identified from plain x-ray

film as radiopaque, faint, or radioluscent. Accordingly, 873 patients (82.6%) were presented with radio-opaque stone, 127 patients (12%) had faint stones and only 57 patients (5.4%) had complete radioluscent stones. A total of 967 (76.93%) patients had acidic urine with urine pH <6 while 970/1063 controls, 91.25% had urine pH <6, and micro-organisms were isolated in 180 (14.32%) patients [Table 1].

Table 1: Summary of the results of 24-h urine analysis

Factor	Total number/total done	Total %
Hyperoxaluria	36/686	5.25
Hypercalciuria	42/695	6.33
Hyperuricosuria	14/727	1.93
Hyperphosphaturia	25/718	3.48
Cystinuria	40/697	7.17
Hyocitraturia	456/693	65.8

Hypercalcemia found in 51 (3.4%) patients, hyperuricemia in 136 (11.01%). Hyperparatyrodisim was reported in 42 (6.38%) patients; all of them had stone recurrence [Table 2].

Table 2: The incidence in hypercalcemia, hypophosphatemia, hyperuricemia, hyperparathyroidism and hypomagnesemia

Factor	Total number/total done	Total %
Hypercalcemia	51/1205	3.4
Hypophosphatemia	39/881	4.43
Hyperuricemia	136/1235	11.01
Hyperparathyroidism	42/690	6.37
Hypomagnesemia	153/796	19.22

Stone analysis was performed on 896 stones, component analysis revealed 378 (42.2%0 were calcium oxalate stones, 203 (22.7%) were mixed calcium oxalate phosphate stones (with or without infection). Uric acid stones found in 171 (19.08%) patients and cysteine stones in 77 (8.59%) [Table 3].

Table 3: The incidence of different types of stones

Factor	Total number/total done	Total %
Calcium oxalate	378	42.19
Calcium oxalate/phosphate	203	22.66
Urate	171	19.08
Struvite	67	7.48
Cystine	77	8.59
Total	896	100

Conference Reports: National Saudi Urological meetings have been held on an annual basis since 1983. Abomelha and Fallatah have collected all the abstracts of the presentations at the Saudi Urological Conference held between 1983 and 1996. With reference to urolithiasis, many have reported certain aspects of their experience and management. Faqih *et al.* reported on the treatment of 444 complicated renal stone patients with non-surgical strategies. Out of those 264 patients treated with PCNL, only 8.7% had residual stones 3 mm or larger on discharge. 110 patients were treated with ESWL mono-therapy and showed a success rate with stone particles residue of not more than 3 mm in three months in 54 patients (49.1%).

Abomelha *et al.* reported on the changing pattern and sizes of the renal calculi through the analysis of the data of more than 3000 stone patients treated in their clinic between 1980 and 1989, it showed decrease of the bulky stones from 28% t 15% and increase of the solitary stone from 14% to 50%. Another review for the same group showed that 21% of their patients were with ureteric calculi. Data from many other centers was presented in reports over many years with reference to observations on special entities of management like management of stag horn uric acid stone, ESWL in renal pelvic ectopia, as well as experiences with modalities of management and generations of lithotripters. It showed beyond doubt that there is continuous interest in reviewing the stone management data and treatment options.

The above studies and reports represent the outline of most of the work conducted on stone diseases in Saudi Arabia, which is not only limited but also non randomized and lacking proper control groups. Abeulhalim study could be considered the only statistically significant epidemiological study. Still there are many important lessons that could be drawn. Above all the high incidence of cysteine and uric acid stone in comparison to reported data from western reports, Herring *et al*.; Murphy and Pyrah. Urine analysis showed that the mean of urine pH in study 1 showed a higher percentage of acidic urine that in control group with a mean urine pH of 5.76%. Robertson *et al.* has reported that the mean urine pH in their study was of less acidic urine and reflected patient communities from the Riyadh area. The mean urine pH was toward the acidic side in the entire patient groups. The observation of Abdulhaim of high fiber and calcium intake in the Saudi stone formers patient, is contrary to the previously reported observations by Griffith *et al*. The stone management in Saudi Arabia took an important leap within the last ten years, with the introduction of the new modalities of the stone management including the Endoscopic surgery as well as Extra Corporeal Shock Wave Lithotripsy (ESWL) which became widely available, with more than (30) ESWL devices distributed in all the regions of the Kingdom. The report of changes in size of the stones presented over the last 10 years confirm the availability of the stone management to the major part of the community. Further well constructed studies of the above variable could confirm or explain the differences between the disease characteristic in this community and previously reported data from different western communities.

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Stone formation on ureteric stent preventing its removal

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Aim is dealing with stones formed on double J ureteric catheter to help its removal. 10 patients were referred after failure to remove their double J catheter due to stones formed on its ends. ESWL was used before catheter removal. Duration of stay of catheter: 2–18 months. After ESWL, 9 catheters were removed cystoscopically, one by pyelotomy and one by cystotomy.

In conclusion, ESWL fragments stones on ureteric stents and facilitates its removal. We recommend early removal or change of ureteric stents within 8 weeks and to advise the patient to attend for its removal in time.

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Percutaneous nephrolithotomy for staghorn stones: A retrospective study

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Management of staghorn stones represents a challenge and controversy still exists regarding the optimal approach. We reviewed our experience with PNL in the management of these difficult cases. Between September 1990 to September 1999, 167 patients were subjected to PNL in our unit; 110 patients were found to have staghorn stones and their records were reviewed. Ages between 15 and 65 years with mean age of 38.2 years. There were 92 males and 18 females. Stones were on the left side in 51 patients, on the right in 46 and bilateral in 10, giving a total of 119 renal units. The whole procedure was done in the operating room by urologists. 144 procedures were performed on the 119 units; 22 units needed more than one sitting. 85 renal units were cleared completely after PNL (71.4%) and 11 units (10%) were left with insignificant fragments: this gives a success rate of 80.8% for PNL as monotherapy. 12 patients with significant residual stones required ESWL. Overall, the success rate of PNL and ESWL for significant residual stones was achieved in 108 renal units (90.8%). PNL failed in 11 (9.2%) patients and they were managed with open surgery under the same anesthesia. All these cases were done before the installation of a lithotripter in our hospital. Average hospital stay was 9.7 days and the average time to stone free state was 23 days. Complications were encountered in 9 cases (8.2%); 3 cases developed sepsis; hemorrhage in 2 cases (which requires nephrectomy in one); 3 cases developed sepsis; hemorrhage in 2 cases (which requires nephrectomy in one); one right colonic injury and 3 stienstrasse. Percutaneous nephrolithotomy is safe and very effective for treatment of staghorn calculi.

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Holium laswer lithotripsy for bladder stones

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Is a new modality in treating urinary stones. Part of the stone is evaporated, the rest either become in the form of powder or small fragments, which evacuated easily.

Over one year we did 20 cases of bladder stones in our hospital using Sphinx Machine. Size of stones range from 3.5 to 5.2 cm. 15 cases needed only one session, 4 cases needed 4 sessions. Energy range from 0.5 to 1.4 joules, frequency from 8 to 14 Hz of total power from 4 to 19 watts. All cases were free of stones and patients can be discharged same or next day.

Conclusion: Holium laser lithotripsy is safe and effective in treating bladder stones.

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Management of ureteric stones in Al Hada Military hospital Taif with multiline Lithostar

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ESWL is an effective and safe method using Siemens Multiline Lithostar in treating ureteric stones. For 18 months, 50 cases of ureteric stones using ESWL alone. We divided these into 3 groups according to stone location, upper, middle and lower ureteric stones.

5 upper, 9 middle, 36 lower ureteric stones, average stone size 1.3 cm. in all cases energy was at level of 9 and an

average of 5500 shock waves per session. 24 cases (48%) required one session, 19 cases (38%) required 2 sessions, 4 cases (8%) required 3 or more sessions, 2 cases (distal ureteric) failed to fragment and needed open surgery after ureterorenoscopy trial. All cases done under sedation with Demerol 1–1.5 mg/kg body weight + Buscopan or Voltaren injection except 3 cases required general anesthesia. ESWL is effective and can be done as an outpatient service.

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Hypocitraturia and stone type

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We reviewed the data of 1257 stone formers managed at King Fahd Military Medical Complex, Dhahran, KSA. The male to female ratio was 3.3:1 with age ranging from 3 to 82 years (mean 40.8 ± 13.34).

Patients and Methods: The clinical work up included urine analysis for (pH, crystalluria and urine culture). We did 24-hour urine analysis for (Na, K, Mg, Ca, pH, protein uric acid, citrate, cysteine and oxalate), blood chemistry for (Na, K, Cl, protein, creatinine, BUN, pH, Ca, Mg and serum uric acid), PTH, T3, radiological evaluation (KUB, IVU, A/S and CT abdomen) and wet chemical stone analysis.

Results: A total of 693 patients had 24-hour urine analysis for citrate, 65.8% had hypocitraturia (<1 mmol/24-hours urine). Of those, 445 stones were analysed, 425 (95.5%) were calcium oxalate containing stones (112 pure calcium oxalate, 85 mixed with urate, 17 mixed with cysteine, and 211 stones as calcium oxalate phosphate). Pure cysteine was found in 11 (2.5%) stones and pure urate in 9 (2%) stones.

Crystalluria in hypocitraturic patients was found in 135 (30.3%) patients. The most common type was calcium oxalate crystals (54.1%), followed by urate crystals in (25.9%) patients. The urine pH of the hypocitraturic patients was acidic in (74.7%) patients.

Conclusion: We conclude that hypocitraturia is a high risk factor in calcium oxalate stone disease in our patients and there is a common incidence of acidic urine in hypocitraturics.

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Crystalluria as a predictor to the stone type

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This is a review of the data of 1257 stone formers managed at King Fahd Military Medical Complex, Dhahran, KSA. The male to female ratio was 3.3:1 with age ranging from 3 to 82 years (mean (40.8 ± 13.34).

Patients and Methods: The clinical work up included urine analysis for (pH, crystalluria and urine culture), 24-hours urine analysis for (Na, K, Mg, Ca, ph, proteins, uric acid, citrate, cysteine and oxalate), blood chemistry for (Na, K, Cl, creatinine, BUN, ph, Ca, Mg, proteins and serum uric acid), PTH and T3, radiological evaluation (KUB, IVU, U/S and CT abdomen) and wet chemical stone analysis.

Results: A total of 309 (24.6%) patients had crystalluria, of them 250 stones were analysed, Calcium oxalate crystals found with 107 (42.8%) stones, urate with 65 (26%), amorphous phosphate with 38 (15.2%), calcium oxalate urate with 22 (8.8%) cysteine with 16 (6.4%) and calcium oxalate phosphate crystals with 2 stones.

In correlation of the stone type to the type of crystals in urine, we found urate crystals in 27/152 (17.8%) of the calcium oxalate and phosphate stones in 32/71 (45.1%) urate, and in 6/27 (22.2%) of the cysteine stones. Cystine crystals in 14 (51.9%) cysteine stones and in 2 calcium oxalate stones.

Calcium oxalate crystals were found in 46.3% of the pure calcium oxalate stones, in 45.6% of the calcium oxalate and phosphate, in 40% of mixed calcium oxalate and urate in 23.1% of calcium oxalate and cysteine stones. Amorphous phosphate crystals were found in 22 (17.6%) of the phosphate containing stones. All calcium oxalate crystals were accompanied by calcium oxalate containing stones, 87.5% of cysteine crystals accompanied cysteine stones, 57.9% of amorphous phosphate crystals accompanied stone containing phosphate, while 49.2% of urate crystals accompanied urate stones.

Conclusion: We conclude that in our patients the types of crystals in urine correlate well with the types of stones in calcium oxalate and cysteine stone formers.

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Extracorporeal shockwave lithotripsy monothrapy for staghorn renal calculi

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Introduction: The role of Extracorporeal Shockwave Lithotripsy (ESWL) monotherapy in the management of staghorn calculi is diminishing because of the high morbidity and the low yield when compared with percutaneous nephrolithotomy or combination therapy. We reviewed our experience with ESWL monotherapy in the management of staghorn stones.

Materials and Methods: Between 1990 and 1999 a total of 186 patients with staghorn stones were treated in our Unit. 76 patients were managed by ESWL alone utilizing a third generation Siemen's Lithostar Plus Lithotriptor, 61 patients were regularly followed up and their records included in this study. There were 24 patients with compete staghorn stones (39.3%), and 37 with partial staghorn stones (60.7%). ESWL was done after routine stenting of the affected side in all cases. The man Shockwave session was 5.2, delivering an average 15940 shocks per patient.

Results: The average hospital stay was 21.68 days; the duration of the treatment was 1–41 months (mean 6.75 months). Significant complication occurred in 23 patients (37.7%) eight of them sustained multiple significant complications. 162 auxiliary procedures were used in conjunction with the ESWL, and in the management of complications. They included 108 double J stenting, 14 ureteroscopies, 18 ureteric catheterizations, 10 percutaneous nephrostomies, nine percutaneous nephrolithotomies, two open nephrolithotomies and one cystolitholapexy. The stone free rate at three months was only 18% but rose by the end of the treatment period 41 months to 63.9%.

Conclusion: ESWL monotherapy for staghorn stones carried an unacceptable morbidity and prolonged hospitalization, as well as a considerably long time to stone free state.

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Study of cristalluria at diabetics subjects (Type I)

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Purpose: The diabetes constitutes a current problem of prevalence public of health, and because the frequency and the gravity of its complications on the other bodies. The lithiasis prevalence in the diabetic population was estimated recently at 21%, almost the double of lithiasis prevalence in the general population. The high frequency of acid uric stone at the diabetic lithiasic ones was the subject of several studies in this field. Our work was consists to detect the positive cristalluria and the most frequent crystalline forms among patients diabetic of type I (insulin-dependent), which gives the clinicians signs on the cristallogenes risk. It could be harmful for the kidneys of these patients and to take preventive therapeutic measures against the various lithiasis.

Methods: The survey includes 116 patients diabetics of type I (for each patient 3 urines of the wakening have been analyzed on average for their cristalluria); the first urine of the wakening has been examined in optic microscope for a qualitative and quantitative analysis of the cristalluria. The withdrawal was preserved to +4°C during 48 hours before examined. Otherwise, a measure of the urine pH measures was achieved systematically at the time of the microscopic exam of the withdrawal. The patients were divided according to their sexes.

Results: The frequency of the positive cristalluria of all the samples studied at the direct examination and +4°C is respectively 21.0% and 39.4%. These values were approximately three times lower than that noticed at the subjects lithiasic. The calcium oxalates were mainly in abundance at the two sexes compared to the other crystalline species, with a frequency of 79.5% at the direct examination and 84.6% at +4°C. The total frequency purins was 22.0% in the direct examination: these crystals were three times more frequent among women than men (16.5% against 5.5%). On the other hand the crystals of phosphatic origin are very seldom observed among patients diabetic (4.1%). At the end the average pH of the diabetic urine was 5.37, when the precipitation of the crystals is generally oxalo-calcic or purina.

Conclusion: The cristalluria observed at the subjects diabetic of type I on the other hand shows the prevalence of the crystals of the oxalo-calcic type (Weddelitte) occupied the first place with a frequency of 64.5% follow up by Whewellite (15.0%). This very high crystals prevalence

of oxalo-calcic doesn't give any different index had that found at the normal subjects. The acidity of the pH urinary of the subjects diabetic of type I raises several questions about the role of the pH. In general the crystallization of purins, confirmed the very high rate of the frequencies of the complex crystals of urate amorphous and of uric acids (22%), it wasn't the case at the subjects lithiasic. The high percentage of the purin cristalluria for the subjects diabetic in general and the female sex in particular determines that the women were state than the men to develop a purin lithiasis in case, gives an index of danger to the clinicians and the experts to deal with this kind of patient in order to eliminate or to reduce the cristallogene risk for a formation of a purin lithiasis.

Key words: Calcium oxalate, cristalluria, diabetic, purins, uric acid

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Effect of some substances chemical on the crystallisation of calcium oxalate *in vivo*

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Purpose: Epidemiological data collected during several decades that the majority of stones, up to 80% are composed of calcium oxalate (CaOx). This current study was aimed to look for an alternative treatment by using chemical substances on nephrolithiasic rabbits as a preventive against the development of urinary stone. The conditions of crystallization and inhibition of oxalate calcium were studied at *in vivo* and *in vitro*. The experiment was conducted in normal and calcium oxalate (CaOx) nephrolithiasic rabbits during three months. Several parameters were flowed every day including water intake, urinary volume and pH and crystalluria.

Objective: Our objective in this part of work was to determine the chemical inhibitors there act on the states of crystallization of calcium oxalate efficiently. A survey previous to the laboratory showed the *in vitro* inhibitory power of the chemical substances that we tested on the calcium oxalate. A comparison will be made between the two studies, only in the goal to confirm or to invalidate a possible effect of inhibition. The studied inhibitory substances are: the citric acid, Mg2+, Fe2+, F-.

Methods: We divided the rabbits aged of 1 month is with a middle weight of 960 g in two groups of 6. The second group was considered like witnesses. The two groups are nourished in industrial food.

Result: The inhibition capacity of Fluoride, citrate, ferric and Magnesium ion were important on the aggregation and size of oxalate calcium crystals, but did not inhibit completely this crystalline species. At maximal concentrations of 12 mM of fluoride ions inhibition was partial (89%). On the other hand, in the presence of citrate ion, the inhibition of calcium oxalate growth and aggregation increased. In fact, at a concentration of 4 mM the inhibition percentage of oxalate calcium crystals was 54%. The addition of a concentration of 4 mM of ion ferric resulted in inhibition of 72% of calcium oxalate. On note that these ions developed an inhibition important enough at the lower concentrations. The same result has been found for Mg2+ ions, it acts was important on the nucleation phase. In the comparison, *in vitro* study showed Fluoride ions acts on the phase of germination and aggregation with a rate of inhibition (73%). The citrate acts on the three phases of crystallization with a rate of inhibition of 96%. The ferric ions act on the phase of growth with a rate of 96%. The Mg2+ ion acts on the three phases of crystallization with a rate of inhibition of 90%.

Conclusion: The study showed to propose the following classification of the power inhibitory *in vivo* on the oxalate of calcium Fluoride ions, Magnesium ions, Ferric ions, citric acid. *In vitro*, the classification was reversed practically: Citric acid, Ferric, Magnesium, and Fluoride ions. These results obtained *in vivo* confirmed the beneficial effect of chemical inhibitors and may justify its use as a preventive agent against the formation of calcium oxalate urinary stones.

Key words: Inhibition, oxalate, rabbit, study, substances inhibitors

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Seasonal variation and increased risk of stone formation

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Abstract Purpose: While seasonal variation in prevalence of stone disease is well described, the time to formation of urinary calculi is unknown. Southwestern Asia is a high-risk environment for stone disease. The aim of our study is to

observe stone disease in a cohort of healthy people during a well-defined period of increased risk of stone formation.

Materials and Methods: A database was constructed for all patients presenting with first symptomatic urinary calculi to Mubarak Al Kabeer Teaching Hospital in Kuwait from January 2002 to December 2004. Patient demographics, monthly climatological data from meteorological department, and time to formation of symptomatic urinary calculi were evaluated.

Results: A total of 200 patients were diagnosed with 220 symptomatic stones. There were 162 (81%) men and 38 (19%) women. Mean time to formation of symptomatic urinary calculi was 90 days with a SD of 45 days. Highest temperatures were recorded in June, July, August and September with an average of 37.4°C. First time of diagnosis a stone disease was noticed in 51% (102 out of 200 patients) in these 4 months. There were significant seasonal variations in the urinary excretion of calcium and uric acid, each showing a maximum during the summer months and a minimum in winter.

Conclusions: This study provides precedent information about the development of symptomatic urinary calculi in a high-risk environment and demonstrates significant seasonal variation in stone formation. Men are at a higher risk of forming stones than women. Seasonal incidence of stone episodes among these 200 stone-formers was higher in summer than in winter.

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Effect of the plant medicinal in the crystallisation of phosphate at pH = 6.5

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Purpose: In this work, we performed an *in vitro* crystallization study enabling the specification of kinetic and thermodynamic conditions of formation and growth of crystalline calcic phosphates species by changing the pH. We used inhibitors, which are medicinal plant which prevent, slow down or reduce crystallization phases.

Methods: We chose the classical model for the study of phosphate crystallization because of its simplicity and satisfactory reproducibility. This model includes the study of crystallization without inhibitor and with it, in order to assess the inhibiting capacity of any chemical species used. Two solutions of two equal volumes of 250 ml of solutions A and B following composition were mixed: A: 11.02 g/l Na_2SO_4 $10H_2O$, 1.46 g/l $MgSO_4$ $7H_2O$, 4.64 g/l NH_4Cl, 12.13 g/l KCl et 0.24 g/l Ca^{2+} and B: 2.65 g/l NaH_2PO_4 $2H_2O$, 18.82 g/l Na_2HPO_4 $12H_2O$, 13.05 g/l NaCl, 1 g/l $Na_3C_6H_5O_7$ $2H_2O$ et 0.05 g/l $C_2O_4^{2-}$. The solution in $C_2O_4^{2-}$ is prepared from oxalic acid. The precipitation of the solid phase of phosphates from artificial urine at different initial pH values (pH = 6.5) was the object of our investigation. The crystal size development was monitored by polarized microscopy at different time intervals. After crystallization time, the mixture was filtered, the recovered dried precipitates were analyzed by FTIR spectroscopy and x-rays diffraction technique.

Results: In the absence of inhibitor, the crystallization of phosphates at pH = 6.5, led to the formation of brushite and amorphous carbonated calcium phosphates (ACCP), after 6 hours. In presence of inhibitor at pH = 6.5, at lower concentrations of sage inhibition was partial. The addition of 1 ml of sage to mixture decrease not only the size of crystal (of 22.1 to 11.4 μm), but also increases the time of induction of brushite (from 40 to 60 min.). After 4 hours the size of crystals stabilized at 20.67 μm. The complete disappearance of brushite crystals was obtained after addition of 10 ml of Sage, only POP and ACCP were formed. In the presence of Camomille, the inhibition of brushite growth and aggregation increased. In fact at a volume of 5 ml the formation of brushite crystals was halted but ACCP persisted. The addition of up to a volume of 20 ml of Camomile resulted in total inhibition and crystalline transformation of the ACCP into carbapatite. The inhibition capacity of artichoke was important at pH = 6.5 on the aggregation and size of brushite crystals, but didn't inhibit completely this crystalline species.

Conclusion: Phosphate compounds encountered in urine can be dangerous and the use of inhibitors to prevent, slow down or reduce crystallization phases might be very helpful. In this investigation, Sage and Camomile proved to be good inhibitors. Its effect increases with solution pH but it is more efficient in less acidic or neutral urine than in alkaline one.

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Combined percutaneous cystolithotripsy and turp for treatment of large bladder calculi with benign prostatic hypertrophy

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Purpose: To evaluate treatment of large bladder calculi associated with obstruction due to benign prostatic hypertrophy (BPH) with combined percutaneous pneumatic cystolithotripsy (PCCL) and transurethral resection of the prostate (TURP).

Patients and Methods: Between May 1998 and August 2001, 40 patients were included into the study. They were divided into two groups. Group I comprised 20 cases presented by large bladder calculi associated with obstructive BPH treated with combined PCCL using lithoclast and TURP. Group II consisted of 20 patients with obstructive BPH with no bladder calculi treated with TURP alone. We used a laparoscope port 10 mm for bladder puncture. The results of group I were compared with those of group II. All the 20 patients with bladder calculi were having single large calculus more than 40 mm in its longest diameter as measured by ultrasound and abdominal x-ray. Patients discovered to have prostate cancer were excluded from the study and also those with small or multiple bladder calculi or with indwelling catheter. Indications for TURP were determined by AUA symptom score, uroflowmetry, the amount of post-voiding residual urine and by cystoscopy. Prophylactic antibiotics were given to all cases.

Results: The average stone size was 52 mm. All stones were fragmented and successfully removed and all the 20 cases were stone free. The average weight of prostatic adenoma as measured by ultrasound was 27 grams (range 18–40) for group I and 30 grams (range 20–45) for group II. The complete surgery time for group I ranged from 50 to 85 with average of 61 minutes. The average surgery time for TURP in group II was 45 minutes (range 35–70). The average duration of catheterization was 5.2 days for group I and 5 days for group II. After catheter removal, all cases were voiding normally. The mean postoperative hospital stay was 4.8 days for group I and 4.5 days for group II. No major complications or deaths occurred, however, three cases of group I and one of group II developed postoperative fever >38°C. Stone analysis revealed struvite stone in 70% of cases (14 cases), uric acid in 4 cases and mixed calcium oxalate and ammonium urate in 2 cases. After follow up of 30 months (range 12–37) no stone recurrence occurred in group I.

Conclusion: PCCL using Pneumatic Lithoclast combined with TURP appears to be an effective, safe, minimally invasive and economical treatment method for patients with large bladder calculi and BPH.

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Detection and significance of carboxy glutamic acid of urine in calcium oxalate stone formers

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Objective: To evaluate the effect of carboxy glutamic acid (Gla) on calcium oxalate stone formation.

Materials and Methods: 24 h urine samples were collected from 25 patients with urinary calcium oxalate lithiasis and 15 controls. The urine was dialyzing and alkaline hydrolyzing. The hydrolysate was applied to an ion exchange column then reacted with OPA. Gla was separated from other amino acids by reversed-phase high performance liquid chromatography (HPLC). Urinary free Gla was reacted with acetonitrile then centrifuge and injected to HPLC column.

Results: Urinary excretion of Gla-bound proteins was 1.44 ± 0.32 mmol/l in the stone patients while 1.82 ± 0.42 mmol/l in the healthy subjects, there was a significant difference between the two groups ($p < 0.05$). Urinary free Gla was 50.76 ± 14.48 mmol/l in the patients while 40.78 ± 8.15 mmol/l in the healthy subjects, there was a highly significant difference between the two groups ($P < 0.01$).

Conclusion: The increase of urinary free Gla and the decrease or deficiency of Gla in Gla-bound proteins in calcium oxalate urolithic patients may play an important role on the calcium oxalate stone formation.

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Hypocitraturia in metabolically active calcium nephrolithiasis

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Hypocitraturia is presumed to contribute to calcium stone formation. In this study, 52 patients with active

calcium urolithiasis have been subjected to infrared spectrophotometric urolith analysis and collection of a 24-hour urinary sample for measurement of citrate, pH, calcium, phosphorus, magnesium, uric acid and oxalate. A venous blood sample was also taken for the measurement of calcium, potassium, uric acid, sodium, phosphorus, carbon dioxide and creatinine levels.

Hypocitraturia was encountered in 93.3% of these patients; either as an isolated anomaly in 11.5% of patients or in association with hyperoxaluria and hyperuricosuria. When hypocitraturia was diagnosed more than half of the patients suffered from the severe form, Hypocitraturia in Egyptian metabolically active stone formers exceeds any universal levels.

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Percutaneous management of lower pole calyceal stone: Upper and middle calyx as preferred accesses

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Objective: Different models of treatment have been used for patients with lower pole calyceal stone. Percutaneous nephrolithotomy has been considered one of the most successful methods in rending patients stone free. The aim of this review was to evaluate the visibility of retrograde nephrostomy access for percutaneous management of lower pole calyceal stone.

Materials and Methods: A total of 21 patients with lower pole calyceal stones have been managed with percutaneous nephrolithotomy. All cases underwent retrograde nephrostomy access. ESWL has been the option in the majority. Accessibility to the lower pole has been evaluated.

Results: Pain was the main complain in 17 patients (81%) and 4 patients (19%) were a symptomatic. Stones were in a calyceal diverticulum in 11 patients. ESWL was the first line of treatment in 16 patients (76%), 11 patients (52%) have been treated twice with ESWL and 3 patients received 3 sections of ESWL. Stone size <10 mm in 3 patients, 10–15 mm in 6 patients, 15–20 mm in 8 patients and 20–25 mm in 7 patients. All except one patient underwent retrograde nephrostomy access, middle calyx access chosen in 16 patients (76%) and upper calyx in 4 patients (14%). In 5 patients (23%) flexible scope has been used to get full access to the lower pole.

Conclusions: Ureteropyeloscopy, PCNL, and ESWL have been successful in managing symptomatic kidney stone, although PCNL appears to exceed all other options for the treatment of lower pole calyceal stone. ESWL may be considered for lower pole stone <10 mm in diameter with around 70% stone-free rate. Patients with lower pole calyceal stone who have failed ESWL and ureteroscopic management should be offered a percutaneous approach, as the results for this endoscopic procedure have been excellent.

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Retrograde supracostal upper pole access for percutaneous nephrolithotomy and endopyelotomy

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Purpose: To review the feasibility and safety of the retrograde supracostal nephrostomy access through the upper calyx in difficult kidney stones and obstruction.

Methods and Material: A total of 36 patients underwent retrograde nephrostomy access through the upper pole for percutaneous nephrolithotomy and endopyelotomy. Subcostal access was our target in all cases. Supracostal access was essential in some of the cases where the subcostal access can not be achieved. Under fluoroscopic control the access is obtained with the anesthesia coordination, the access path is controlled by the inspiration and expiration phases of the lung. Chest x-ray is done routinely in the recovery room to rule out hemo/pneumothorax.

Results: Stone burden consisted of 6 staghorn calculi, 4 patients with 2.5–3 cm stone, 10 patients with 2.0–2.5 cm stone, 8 patients with stone size less than 1.5 cm. 6 patients had ESWL three times and 6 patients had ESWL two times. Stones location was in upper ureter in 8 patients, lower calyx in 17, middle calyx and renal pelvis in 27. Percutaneous endopyelotomy carried out in 4 patients. 20 patients (55%) had retrograde supracostal access (above the 12th or 11th rib). 16 patients (44%) had the PCNL in the supine position. Overall, stone free rate was 96%. None of the patients developed hydro/pneumothorax. No blood transfusion was required.

Conclusion: Upper calyx access can be achieved with low risk of injury in cases where the middle and lower calyx are not appropriate. Retrograde technique could achieve an access through the upper calyx safely comparable to the antegrade technique. Supracostal access showed no risk for lung injury.

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Retrograde nephrostomy access for percutaneous laser endopyelotomy through the upper calyx (Video Presentation)

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Objective: To show the feasibility of retrograde nephrostomy access through the upper calyx in treating difficult kidney stones and UPJ obstruction.

Methods: Retrograde nephrostomy access through the upper calyx performed in 37 patients for percutaneous nephrolithotomy and percutaneous endopyelotomy. 3 patients underwent retrograde access and percutaneous laser endopyelotomy. The video clip is regarding 15-year old girl presented with right flank pain. Renal ultrasound showed severe right hydronephrosis. Nuclear scan showed significant ureteropelvic junction obstruction with **t** ½ life of 40 minutes and 25% function. Patient underwent retrograde nephrostomy access through the upper calyx and percutaneous laser endopyelotomy in a supine position.

Results: All patients underwent retrograde nephrostomy access through upper calyx have not developed lung or plural injury. Chest x-ray is routinely done for upper calyx access. None of the patients required blood transfusion.

Conclusion: Upper calyx access can be achieved with low risk of injury. Retrograde nephrostomy is a safe and effective method for establishment of a percutaneous nephrostomy tract.

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Whether post urs stenting is necessary or not?

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Objective: To verify if post URS stenting is still necessary as a routine strategy or some cases can be treated without the need of stenting.

Patients and Methods: Between August 2004 and April 2005, 85 patients presented with ureteric stones of different size and site. All were scheduled and treated by the ureteroscopy method. According to certain criteria, 45 patients left non stented at the end of the operation (non stented group) while 40 patients left with stent (stented group). The ages of the non stented group ranged between 6 and 70 years (mean 34.36 ± 15.53) while the size of the stones ranged between 5 and 20 mm. (mean 8.4 ± 3.1). They were 33 males while 12 females. As regard size 26 stones were in the right while 19 were in the left ureter. In stented group, their ages ranged between 14 and 70 years (mean 39.35 ± 13.36). While the size of the stones ranged between 6 and 16 mm. (mean 9.9 ± 3.2). They were 34 males while 6 patients were females. 25 stones were on the right ureter while 15 of them were on the left.

Results: Success was 100% in non stented group while it was 39 out of 40 in stented group, but the two groups were compared statistically from the points of post operative analgesia, post operative color clearance of urine and hospital stay which were found significantly different, while operative time the difference was insignificant.

Conclusion: In case of treating ureteric stones by ureteroscopy post operative stenting should not be used as routine but should be limited to those with ureteric injury, bigger sizes and prolonged operative time. Non stenting method decreases the need of post operative analgesia, time of color clearance and hospital stay.

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Ureteric dilatation before ureteroscopy for management of distal ureteric calculi

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Objective: The aim of this study was to compare patients with and with no ureteric dilatation before ureteroscopy for treatment of lower ureteric stones.

Patients and Methods: Between January 2004 and January 2005, 156 patients at Cairo University Hospital with stone lower ureter underwent ureteroscopy for removal of distal ureteric stones. The patients were randomized preoperatively and divided into 2 groups. 78 patients each underwent ureteroscopy without dilatation of lower ureter (group I) and with dilatation of lower ureter (group II). The mean operative time, hospital stay, complications and success rate were recorded in each group of patients.

Results: In group I of patients the mean operative time was 35 minutes, the mean hospital stay was 1.2 days and complication rate was 15.4%. In group II, the mean operative time, mean hospital stay and complication rate were 45 minutes, 1.5 days and 23.1% respectively. The success rate was 93.6% in group I versus 96.2% in group II.

Conclusion: Ureteroscopy is simple, safe and successful technique for treatment of distal ureteral calculi without dilation of lower ureter.

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PCNL in the supine position

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Objective: Whether or not a supine position is suitable and save option for doing PCNL.

Patients and Methods: Between June 2002 and June 2003, thirty patients with kidney stones were subjected to PCNL in supine position after insertion of ureteric catheter for localization. Twenty seven were males and three were females, while 17 patients, the stones were in the left and in 11 patients were in the right. The age of the patients ranged between 26 and 70 (39.8). The stone size ranged between 15 and 40 mm (25 mm). Operative time was 40–180 minutes (80 minutes) and hospital stay was 2–4 days (2.6 days).

Results: The success was 26 out of 30 (86.6%) while failure was 4. Major complication in the form of colonic injury happened in only one case. Minor complications in the form of leakage occurred in 2 cases, fever in one case, residual small fragments in 2 cases, 2yr hemorrhage in one case.

Discussion: PCNL in the supine position doesn't need to turn the patient so this decrease the time and work. Most of the fragments came out spontaneously so also the time is decreased. In addition vision is clearer. Respiration is smoother. Complications are also accepted.

Conclusion: PCNL can be done in the supine position with good success rate and acceptable complications with less time and work and nice clarity of vision.

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Percutaneous nephrolithotomy in adult polycystic kidney disease: An efficient and safe approach

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Introduction: Adult polycystic kidney disease is a condition with multiple cysts and metabolic disorder that will lead to increased stone formation, percutaneous nephrolithotomy (PCNL) in this subgroup of patients need special expertise and care and it is an excellent method to render those patients stone free.

Materials and Methods: During the period 2000–2003, 4 renal units in three kidney patients who had a renal stone with known adult polycystic kidney disease were managed with PCNL. One patient had bilateral kidney stones with partial Staghorn stone in right side and large renal pelvic stone in the left. The size of stone was 4cm in left and 5cm on the right. One patient had large left renal pelvic stone around 3cm and the last patient had 2cm lower caliceal stones. The last patient failed SWL once. All the patients were males and age was 38, 32, 60 respectively. All of them underwent preoperative CT scan and all had normal renal function. The procedure was done in the standard technique using fluoroscopic guidance to puncture the kidney. The best technical trick used to avoid dilation of the renal cyst was to inject methylene blue with the contrast. When puncturing the kidney so when a blue effluent seen in the target, then dilation done.

Results: All patients had successful PCNL, the patient who had bilateral kidney stones had 2 procedures, one at a time with 2 weeks in between. All patients had one puncture except the partial Staghorn required two punctures. Dilation was done with balloon dilations and duration of surgery was 70–150 min. No blood transfusion required. All patients were rendered stone free in one session, except for a partial Staghorn case that required a second look in that side 2 days postoperatively. All patients had (N) renal function postoperatively.

Discussion: Adult polycystic kidney disease is known to be associated with urolithiasis. Few reports described the effectiveness of PCNL. Early diagnosis and prompt treatment of urolithiasis in those patients will help preserve renal function. The use of methylene blue with contrast has facilitated accurate access and helped to avoid unnecessary tract dilation since cyst puncture can yield fluid similar to urine. Renal function was preserved in all patients followed.

Conclusion: Percutaneous nephrolithotomy in adult polycystic kidney disease is efficient and safe and needs special expertise in this procedure.

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Whether post-percutaneous nephrolithotomy nephrolithotomy tube is necessary or not…?

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Objective: To verify the need of post PCNL nephrostomy tube and if it is still necessary a routine step.

Materials and Methods: A total of fifty two patients with renal stones of 2–5 cm in size underwent tubeless percutaneous nephrolithotomy from July 2004 to December 2005. A ureteric catheter no. 6, which used for localization, was left with Foley catheter for 7–72 hours. The approach was through prone position in 42 patients while 10 were done done through supine one. The outcome, stone-free rate, transfusion, hospital stay and complications were reviewed.

Results: Stone-free rate of 92.3% was achieved and the main hospital stay was 49.7 hours while operative pain and the need of analgesic was decreased and blood transfusion was given for 4 patients. Minor collection (30–80 ccs) around the targeted kidney occurred in two patients, urinary leakage which needed insertion of double J catheter occurred in one patient and increased of back pressure with high temperature which needed ureteroscopy and double J catheter.

Conclusion: Tubeless PCNL is a safe and effective procedure and decrease post operative pain and discomfort provided that no major extravasation, residual stones and serious bleeding.

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Percutaneous nephrolithotomy whether prone or supine position is preferable

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Objective: To know the safety and effectiveness of doing PCNL in supine position and to compare it to standard prone one.

Material and Methods: Between January 2002 and February 2004, 77 patients with renal stones prospectively randomized to be subjected to PCNL. First group (40) patients were done in prone while second one (37) patients were done in supine one. Both groups were compared from the technical aspects, success and complications.

Results: The success rate was 92.5% and 91.9% in prone and supine groups respectively with no significant difference. Complications were 7.5 and 10.4 in both groups respectively and most of them were minor apart from colonic injury which occurred in 2 and 1 case respectively.

Conclusion: Accessibility to pelvicalyceal system stone retrieval and disintegration is feasible and safe in supine position like if it is in prone one with some advantages like ease respiration, better venous return, accessibility to intubations and spontaneous passage of small fragments.

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Percutaneous nephrolithotripsy for calculi in ectopic pelvic kidneys

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Introduction: Percutaneous nephrolithotomy (PCNL), although an accepted treatment modality in anatomically normal kidneys, is still not universally performed for calculi in pelvic ectopic kidneys. Fear of injury to abdominal viscera makes it a technically challenging procedure.

Objectives: Defining the place of PCNL method for treatment of calculi in ectopic pelvic kidney.

Materials and Methods: We have performed PCNL in nine patients with calculi in pelvic ectopic kidneys over the last five years. The patients were placed in supine position, and the procedure performed using some non technical factors which made the procedure safe.

Results: Complete stone clearance was achieved in all cases. Six patients were treated in a single stage, while three patients required two stages. Seven patients needed only one tract and two needed two tracts. No notable complications were encountered. The hospital stay was 5.2 days.

Conclusion: With proper precautions and meticulous technique, PCNL is a safe and effective modality to treat calculi in pelvic ectopic kidney.

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Anatrophic nephrolithotomy for complete staghorn calculI: Experience, simplified modification and functional results

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Objective: To present our experience in Anatrophic nephrolithotomy as a first choice option for complete staghorn calculi using a simplified modification and assess its functional results.

Patients and Methods: Between 1988 and 2005, 14 patients (9 men and 5 women, mean age 42.1, range 23–62 years) with complete staghorn stones were treated using a simplified modification of anatrophic nephrolithotomy. All patients had complex staghorn stones occupying all the pelvicalyceal system with infundibular stenosis and caliceal dilatation. Partial staghorn calculi were not included. Patients were evaluated preoperatively with serum creatinine, urine cultures, plain films and IVU; occasionally CT scan for less radio-opaque stones. Renal function was assessed using DMSA renal scan preoperatively and 6 weeks postoperatively in 11 patients. A repeated renal scan was performed in the 6-month visit for patients with decreased ipsilateral renal function on the 6-week scan. Plain films, IVU and ultrasound were used to assess the stone-free rate postoperatively. Operative duration and ischaemia time were calculated for each patient. Details of the technique will be shown in a digital video clip.

Results: Nine stones were in the left kidney, five were in the right and three were recurrent after open surgery. No mortality was reported and perioperative complications were negligible. The mean (range) operative duration was 183.8 (140–250) min. and the estimated intraoperative blood loss was 380 (250–800) ml. Two units of blood transfusion were necessary in one patient after surgery. The mean (range) cold renal ischaemia time was 56 (40–78) min. and the hospital stay was 5 (4–7) days. Four patients had evidence of urease producing organisms in their urine cultures and received the appropriate antibiotics. The mean follow up was 16.8 (6–48) months. Thirteen of the 14 patients were completely stone-free (92.9%). One patient had a residual asymptomatic 5 mm. stone in an upper minor calyx that passed spontaneously 4 months after surgery. Overall serum creatinine levels remain unchanged. Follow up DMSA scan in 11 patients showed a slight decrease in ipsilateral kidney function in 4, unchanged renal function in 5 and improved renal function in 2.

Conclusions: Anatrophic nephrolithotomy achieves a high stone-free status through a single procedure with a short hospital stay. The procedure outweighs the risks associated with multiple less invasive interventions. The presented modifications simplified the procedure ensuring a more feasibility and better functional results.

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Is steinstrasse after extracorporeal shock wave lithotripsyof renal stones predictable? Artificial neural network analysis

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Objectives: The aim of this work is to use an artificial neural network (ANN) to predict patients who may develop steinstrasse after ESWL of renal stones.

Methods: Between February 1989 and February 1997, 2957 patients with renal stones (71.6% males, 28.4% females; mean age 40.7 ± 10.5 years) were treated by ESWL using

Dornier MFL-5000. Stone-free status was determined utilizing urinary tract plain x-ray, intravenous urography and renal ultrasonography. Steinstrasse developed in 144 patients (4.9%) after treatment. 98 patients (68%) eventually passed the steinstrasse spontaneously while the remaining 46 required intervention. Nine variables were used as input parameters to an ANN. These variables included patient age and sex; renal anatomy (normal, pyelonephritic, obstructed); stone(s) site (upper calyx, middle calyx, lower calyx, renal pelvis, multiple sites), side (right, left), number, length, width and whether de novo or recurrent. PREDICT software program (Neural Ware Inc., 2002) was used to construct a 3-layer feed-forward neural network, with back-propagation of error algorithm. The network was trained on randomly selected 2069 patients (70%) to predict those who developed steinstrasse after treatment. Generalization of the trained network was evaluated on the remaining 888 patients (30%) (test set) and the sensitivity (percentage of correctly predicted steinstrasse), specificity (percentage of correctly predicted non-steinstrasse), average classification rate and overall accuracy were calculated. The relevant variables influencing construction of the ANN were determined using contribution analysis.

Results: Evaluating the performance of the trained ANN on a separate test set, to predict those who will develop steinstrasse, revealed a sensitivity of 72.1%, a specificity of 82.5%, average classification rate of 77.3% and an overall accuracy of 82%. Length, width and site of the stones and renal anatomy are the most important va

Conclusions: Neural network has good ability to predict patients who are liable to develop steinstrasse after ESWL of renal stones. This may be useful during follow up to guide more frequent visits and monitoring of those who are likely to develop steinstrasse, so as to avoid silent obstruction and loss of the renal units.

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A slow versus a fast shock wave lithotripsy rate for urolithiasis: A prospective randomized study

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Purpose: To determine the effect of shockwave lithotripsy (SWL) rate on the treatment outcome in patients with renal and ureteric stones.

Patients and Methods: One hundred and fifty six patients were prospectively randomized to receive SWL using either a slow (60 pulse/min) or fast rate (120 pulse/min). Inclusion criteria were patients with a single radiopaque renal or ureteric stone not exceeding 30 mm in maximum diameter. Patients' characteristics, stone and therapy features were reviewed and correlations to success rate and total number of shockwaves required were made using Chi-square, Fisher Exact and Mann Whitney tests. Factors proved to be significant in univariate analysis were entered in a multivariate logistic regression analysis.

Results: The study included 114 male patients (73%) and 42 females (26.9%), with a mean age ± SD of 42.1 ± 13.3 years. Stone length, measured in maximum diameter, is 13.2 ± 5.9 mm (range 5–30 mm). Renal stones were encountered in 94 (60.3%) patients and ureteric stones in 62 (39.7%). The slow SWL rate was utilized in 76 (48.7%) patients and the fast rate in 80 (51.3%). Baseline variables including sex, involved side, stone length and number of sessions were comparable in both groups. However, the total number of shockwaves required were statistically significantly lower in the slow rate group ($P = 0.004$). The success rate, defined as being completely stone free or having clinically insignificant gravel less than 2 mm, was significantly higher with slow rate ($P = 0.034$), increased number of sessions ($P = 0.001$), diminished stone length ($P = 0.000$) and more total number of shockwaves ($P = 0.011$). However, only slow SWL rate and stone length maintained a statistically significant impact in multivariate analysis.

Conclusions: The slow SWL rate is associated with a significantly higher success rate at a less number of total shockwaves compared to fast SWL rate.

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Efficacy of local anesthesia versus intramuscular sedation in extracorporeal shock wave lithotripsy

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Purpose: We studied the effectiveness of local infiltration anaesthesia compared to intramuscular sedation in relieving pain during extra corporeal shock wave lithotripsy.

Material and Methods: A total of 31 adult patients with renal or ureteric stone disease underwent ESWL. Patients were prospectively randomised to receive either intramuscular sedation or local infiltration anaesthesia. Pain tolerance during the procedure was assessed using international pain scale graded from 0 to 5.

Results: Since 9 September 2004 (and still ongoing): 31 adult patients [18 males (58%) and 13 females (41%)], age range of 17–62 y.o. 26 had renal (83%) and 5 had ureteric (16%) stone diseases. Stone size ranged from 0.5 to 2 cm they underwent ESWL, 21 received intramuscular sedation in form of Demmerol 50 mg + Phenorgan 25 mg, and 10 received local anaesthesia in form of mixture of 1% Xylocaine + 0.5% Marcaine infiltrated over targeted area using the coupling cushion as guide. Using the international pain scale, both groups showed median pain tolerance of 1.

Conclusion: Local anaesthesia is a valid option and effective in ESWL.

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Treatment of renal calculi by lithotripsy: Minimising shock wave induced renal damage by using antioxidants (200-07-05)

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Objectives: The safety of the method has been of major concern since it was introduced in 1982 as the shockwaves have been shown to induce acute and chronic lesions in the kidneys and adjacent organs. The present study was designed to find out; if ESWL procedures free radicals due to ischaemia and reperfusion (I/R) injury, and if the administration of antioxidants can reduce the amount of damage to the kidney.

Methods: 90 patients with renal stones (1–3 cm) had "J" stents inserted. Patients were divided into 3 treatment groups: (a) Group A (Control Group, $N = 29$) no oxidants given, (b) Group B ($N = 34$) given 2 capsules of "Nature Made R" (antioxidants) 2 hours before ESWL, and 2 and 8 hours after ESWL, (c) Group C ($N = 27$) given 2 capsules of "Nature Made R" 2 and 8 hours after ESWL. Blood and urine samples were obtained from all patients, just before start of treatment by ESWL, and at 2 hours, 24 hours, 7 days and 28 days after ESWL. Serum levels of malondialdehyde (MDA) – a measure of lipid peroxidation and free radical damage, tocopherol, ascorbic acid and C-reactive protein (CRP) were determined.

Results: Patients given antioxidants had significantly reduced serum MDA and higher ascorbic acid levels compared to untreated patients ($P < 0.001$).

Conclusion: Ascorbic acid is a potent free radical scavenger that protects unsaturated fatty acids in cell membranes from attacks by peroxides. Since patients given "Nature Made R" capsules have higher serum ascorbic acid levels ($P < 0.001$) compared to control, this indicates that the capsule is an effective antioxidant as it helps to maintain a high ascorbic acid level in those taking the capsules. This finding also confirms that ESWL generates free radicals through I/R injury mechanism.

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Recognition of the incidence and strategies in management of steinstrasses

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Objective: To identify the incidence rate of steinstrasse in all patients post ESWL for renal stones, to study the efficacy of ESWL using Dorniers doli U/50 Lithotripter in treating these steinstrasses.

Methods: We reviewed the charts of 1647 patients who underwent ESWL in the last 5 years regarding the clinical presentation, incidence of steinstrasses, the requirement of nephrostomy or DJ stent insertion, and we classified the steinstrasses according to its location, length and size of the fragments.

Results: 63 (3.8%) patients had steinstrasses post ESWL, renal stones of a diameter of 1cm or less had not developed any steinstrasses, while in stones of 10–20 mm diameter steinstrasses developed in 3 cases (0.42%) out of 702 cases, in renal stones diameter of 30–40 mm steinstrasses developed in 14 patients (5.03%), in renal stones larger than 40 mm

steinstrasses developed in 35 (23.8%) patients and all patients with staghorn stones developed steinstrasses. Descriptive detailed results will be presented.

Conclusion: The incidence rate of steinstrasses post ESWL is low, ESWL is an effective method of treating these steinstrasses, and our study confirms the unnecessary of prophylactic insertion of DJ stents to prevent complications of steinstrasses.

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Retrograde intrarenal lithotripsy outcome in non extracorporeal shock wave lithotripsy responders

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Purpose: We report our experience with retrograde intrarenal lithotripsy (RIRL) for the treatment of renal pelvic stones not disintegrated by shock wave lithotripsy. Our aim was to break the stones to facilitate ESWL treatment.

Materials and Methods: A total of 56 patients (53 males and 3 females) with mean age 41 years (range from 25 to 57) were studied in the time period from January 1998 to December 2003. Each patient with one stone, they had been treated with 102 ESWL sessions (2 sessions for each stone) with no response. The stones size range between 20 to 29 mm in 37 patients and 30 to 39 mm in 19 patients. Double J stent was inserted before RIRL procedure and rigid ureteroscopy with pneumatic lithoclast was used in treatment of all cases. ESWL was used after RIRAL in some cases.

Results: Out of 56 non ESWL responder stones, 18 were disintegrated to small fragments that passed and cleared spontaneously within 4–6 weeks after the procedure. No ESWL sessions were needed post RIRL. The remaining 38 stones were disintegrated into multiple fragments that required 1 ESWL session in 16 patients and 2 ESWL sessions in 22 patients. Stone clearance was achieved in 28/38 patients (74%) after 3 months. The remaining 10 stones were cleared out within the 4 months without need for more ESWL sessions. There is no reported treatment failure or major complications. The DJ stent was removed after 3 months in 28 patients and after 4 months in 10 patients. We had achieved complete clearance in 46 patients (82%) and some insignificant residual fragments in 10 patients (18%).

Conclusions: RIRL followed by ESWL in non ESWL responders is an effective and safe modality of treatment of renal pelvic stones. We recommend using this technique prior to ESWL in large pelvic stones to achieve good fragmentation, early clearance and less number of ESWL treatment sessions.

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Improving the clearance of lower caliceal stones after extracorporeal shock wave lithotripsy

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Objectives: To study if boosted shockwave lithotripsy (SWL) with diuresis as a primary treatment for lower caliceal stones (LCS) would improve their clearance.

Subjects and Methods: A prospective randomized controlled study of 137 patients with LCS < 20 mm in diameter was undertaken. In the active treatment group (ASWL), intravenous hydration with 1000 ml normal saline and 40mg furosemide were started 30 minutes before the procedure and continued during SWL. An a boosted technique was used which is consisted of 3 planned sessions (S1, S2, S3) 7 days apart when needed at day 1 (D1), D8 and D15 as a stir up procedure if residual fragments was > 5 mm. On D8 and D15 follow up was done with plain film of kidney, ureter and bladder (KUB), tomography and renal ultrasound (US). The control treatment group CSWL no diuresis with furosemide was given during SWL. SWL was repeated only for incomplete fragmentation. Clearance was assisted at week (W) one, W4, W8 and W12 after completion of the needed sessions using the same methods (KUB, tomography, US).

Results: In the ASWL, 59 patients completed the study with mean age and standard deviation (SD) of 40.3 (9.0) years, 50 males and the mean (SD) stone size of 14.5 (9.2) mm. In the CSWL, 62 patients completed the study with age mean (SD) of 39.9 (11.0) years, 51 males and the mean (SD) stone size of 15.5 (3.6) mm, which were not significantly different from ASWL. The mean (SD) number of sessions and shockwaves were 1.5 (0.7) and 6085 (5300) in ASWL compared to 1.2 (0.05) and 4361 (2584) in CSWL ($P = 0.008$ and 0.026 respectively). The mean (SD) time to clearance was 6.1 (3.9) weeks in ASWL compared to 11.2 (4.3) in CSWL ($P = 0.000$). Residual fragments (RF) were present in 10 (17%) patients in ASWL compared to 34 (55%) in CSWL ($P = 0.000$).

Conclusion: As a primary treatment, Boosted SWL with diuresis is effective in improving the clearance of LCS > 10 mm.

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Clinical experience of extracorporeal shock wave lithotripsytreatment for 2241 renal calculi

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Purpose: We report our results of ESWL treatment of 1647 patients with 2241 renal calculi.

Patients and Methods: All patients were treated with Dornier Doli U/50 lithotripter on outpatient basis in the period from January 1998 to December 2003. Intravenous sedation (Pethidine and Medazolam) was given to 85.5% of patients and general anesthesia was given to the remaining 14.5%. The treatment outcome of 2241 renal calculi were analyzed and stratified according to size and site of the stones. Patients were categorized in 5 groups according to stone size. Auxiliary measures were used in 258 patients (15.7%). Follow up for at least one year was available for all patients.

Results: Successful disintegration was achieved in 2154 renal stones (96.1%), stone free rate (SFR) at 3 month was reported in 2007 renal stones (89.5%). The overall re-treatment rate was 57.2% and for each group it was reported as follows: (23.5%) for the first group, (36.1%) for the second group, (85.5%) for the third group and (100%) for the fourth and fifth groups. We reported treatment failure in 87 patients (3.9%) with stone sized ranged from 20 to 40. Complications necessitate hospital admission were reported in 20 patients (1.2%).

Conclusion: ESWL is a safe and effective modality for the treatment of renal stones. It should be conducted by experts of ESWL or under their direct supervision to achieve the best treatment results regarding the SFR, fragmentation rate and less re-treatment as well as complications rate. Analysis of treatment results should be directed to the size of the stone in each group and not to analyze the treatment result of all stones with different sizes together.

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Is it possible to predict extracorporeal shock wave lithotripsy failures

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Introduction and Objectives: The composition of urinary calculi is of critical important in determining stone fragmentation by extracorporeal shock wave lithotripsy (ESWL). Several studies have shown that calcium oxalate monohydrate (COM), brushite and cystine stones do not fragment well by ESWL. If these calculi can be identified *in vivo*, patients can be spared the cost and unnecessary morbidity ESWL. In addition, the success of ESWL depends on stone burden. The ability of conventional radiography to predict the chemical composition of urinary calculi or to assess the stone burden is limited. The present study is an attempt to estimate accurately *in vivo* the stone burden as well as to predict the stone composition.

Material and Methods: This study was conducted on 100 patients with renal and upper calculi whose stone were suitable not to ESWL, and required surgical or endoscopic removal of their calculi. In addition to routine imaging, patients were subjected to non-contrast spiral computed tomography (NCSCT) utilizing the flank pain protocol at 120 kv; 185 mA with 5 mm collimation. The measured parameters included the mean attenuation value of the stones and their largest transverse diameter. The Hounsfield unit density was calculated by dividing the mean attenuation value by the largest transverse diameter in millimeters. Stones were analyzed chemically and by infrared spectroscopy (Beckman Micro Lab 252 MX).

Results - Stone size: In 35 patients in whom the stone were retrieved intact by open surgery, the NCSCT measured size was almost equal to the actual size ± 1.5% where as the size measured on KUB varied between -30% in struvite calculi to +21% in COM calculi; KUB accurately measured the stone size in 26% of the calculi only. **Stone composition:** The mean attenuation values of stones formed of brushite, calcium oxalate monohydrate (COM), calcium oxalate dehydrate (COD), struvite, mixed calcium oxalate, cystine and uric acid were 1312, 1091, 772, 715, 698, 691, and 434 respectively. Noteworthy is this study included seven patients whose calculi were not fragmented by ESWL; such stones were composed of COM and their attenuation values ranged between 1008 and 1446 with a mean of 1194. **Cutoff values:** Cutoff values of the attenuation values were determined based on the highest sensitivity and specificity by receiver operating characteristics and area under curve, and were as follows: >992 for COM, <838 for COD, >723 for struvite and <625 for uric acid stones.

Conclusion: NCSCT proved to superior to conventional radiography for detection of radiolucent calculi, for accurate measurement of the stone burden and for predicting stone composition *in vivo*.

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Effect of modification of shockwave delivery on stone fragmentation

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Purpose of Review: Although SWL has been the mainstay of urinary stone treatment over the past 20 years, with three generations of lithotripters now in the market place, little improvement has been made in the overall efficiency since the original HM3. However, over the past 5 years much progress has been made in the basic research of SWU with better understanding of the mechanisms involved in stone fragmentation. This has led to new modifications in the way the shock wave pulse is generated and delivered.

Recent Findings: Clinical studies reflecting improved understanding of basic mechanisms of stone comminution are being published. Two recent prospective clinical trials have shown the higher efficiency of slow rate vs fast rate SWL. This is a very practical solution requiring no hardware upgrade albeit at longer procedure times. Other promising developments include the use of twin head technology with either simultaneous or sequential shock waves. In addition, chemolytic pretreatment and dose escalation techniques have shown encouraging early results. This review provides an update of the latest shock wave technology and delivery strategies.

Summary: Long term studies to document anticipated improved safety with slow shock wave rate are needed. Future *in vivo* and clinical studies of twin head technology and dose escalation strategy of SWL may well pave the way for new lithotripter designs that will lead to improved stone free rates while simultaneously reducing associated renal trauma.

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Biochemical and bacteriological study of urinary calculi

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Objective: To analyze the biochemical and bacteriological data in urolithiasis patients with documented urinary tract infections.

Methods: Biochemical and bacteriological study of urine, nidus and chemical analysis of 1,257 calculi from 1,257 patients admitted in King Fahd Military Medical Complex, Dhahran, Saudi Arabia from January 1989 to December 2001 were performed.

Results: A total of 135 (10.7%) patients had documented urinary tract infection. Escherichia Coli was the commonest bacteria isolated and only in 15 (11%) patients a urea splitting organism was documented. The commonest radical present in the calculi was calcium whilst the rarest was uric acid. The stones were composed mainly of calcium oxalate and/or phosphate followed by struvite, cystine and mixed stones. Ninety-eight (72.5%) patients had an acidic (pH 5–6) urine while 28 (20.7%) patients had an alkaline (>6.5–8.5) pH.

Conclusion: Most of the documented urinary tract infections in stone formers (in this study) were caused by a non-urea splitting organisms and the majority had an acidic urine. Cystine stones seem to be a predisposing factor to urinary tract infection.

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Infrared spectroscopy analysis of urinary lithiasis collected in the eastern part of Algeria: Morphoconstitutional classification and correlations with etiology

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Urinary calculi are a pathological materials and the knowledge of their structure and composition appears to be the key for establishing the etiology of the stone disease. The Fournier Transform Infrared Spectroscopy (FTIR) associated with microscopic examination is well suited for calculi analysis. They provide extensive information on both stone structure and its crystalline composition.

More than 50 calculi, collected from the Eastern part of Algeria in 2005, were analyzed using the combination of microscopic examination and FTIR analysis. In this study we have:

- Detected the heterogeneities in each calculus and analyzed separately its core, section, and surface;
- Recognized morphologically the type and the subtype of the stones;
- Determined precisely the qualitative and quantitative composition of the calculi;
- Correlated between the different types and subtypes of the stones and the corresponding etiopathogenic conditions most frequently observed.

The main etiologies are deduced from the basis of the sequential semi-quantitative analysis, quantitative analysis of the global powder, and by comparison with different percentages of the constituents in each calculus. The major constituent in the set we considered is whewellite (54.3%). It mainly depends on high oxalate urinary concentration, whatever the specific cause of hyperoxaluria. The weddellite is about 17.4%, which almost always are associated with hypercalciuria. The struvite is found with 8.7% of the calculi. It shows the existence of urinary infections with ureasic-producing organisms. The uric acids, anhydrous and dehydrate, are found with a frequency of 13%.

They imply urinary acid supersaturation, resulting either from hyperuricosuria or low urine pH. Finally, 13% of the calculi contain the ammonium hydrogen urate rather are formed in alkaline or weakly acid urine with, usually, a high renal ammoniagenesis.

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Tamsulosin effect on the peristalsis of completely and partially obstructed ureter in the anesthetized dog

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Introduction and Objective: Tamsulosin (T) proved clinically useful for increased ureteric stone expulsion, reduced expulsion time and reduced need for analgesic therapy. In dogs duodenal administration of T results in peak plasma level after 30 minutes and peak effect on prostatic urethral pressure at 90 minutes in dogs. We set out to study the effect of T on ureteric pressure in the anesthetized dog to elucidate the mechanism by which T provide its effect.

Methods: Ten mongrel dogs were divided into two equal groups. Under general anesthesia a midline abdominal incision was made and bladder opened. A 6 French ureteric catheter was inserted 5 cm into each ureter and fixed by a purse string 2 zero silk sutures. Each catheter was connected to a pressure transducer. Partial obstruction was created by venting one ureteric catheter with a 23 gauge needle through a 3 way connection. Femoral artery cannula was used to monitor blood pressure. A 20 French Nelaton catheter was inserted into the proximal duodenum through a gastronomy incision for drug delivery. Intravenous saline (S) infusion was kept constant at 10 ml/kg/hour. After 30 minutes T 30 ug/kg B.W. was administered in 30 ml S in one group. The control group received S alone. Blood pressure, ureteric pressure, ureteric peristalsis per min and amplitude of peristalsis were monitored and measured before and 30, 60, 90, 120, 150 and 180 minutes after drug administration. Data were compared between control and drug groups using ANOVA and expressed in mean and standard deviation (SD).

Results: Dogs weighed 20.6 SD 6.5 and 21 SD 5.9 kg for control and T groups. There was no significant difference in all measured parameters between the two groups ($p < 0.05$).

Conclusion: In our *in vivo* study of dog ureter, no effect of T could be documented explaining its facilitator stone expulsion effect. Further evaluation of T effect on intramural ureter is the next step.

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Cystine stone: Epidemiological analysis

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Introduction: Cystine stones represent a rare type of stones which are difficult to deal with in the clinical practice. We retrospectively review the epidemiologic features of our patients with this kind of stones to identify the important parameters that may help in diagnosis and guide the optimal therapy.

Materials and Methods: The medical records of patients with stone disease diagnosed as cystine were reviewed as regards to age, sex, laterality, site, size and side of the stone, together with the urine and serum parameters and imaging features.

Results: 41 cystine stone events in 15 patients were treated in the Urology Department utilizing the different modalities of intervention together with medical therapy. Patients were from different geographical areas including Turaif (1 patient), Qwaiyah (2), Qunfada (1), Buljarshi (1), Najran (2), Bisha (1), Qatif (2), Abha (1), Alhassa (2); one patient was from Sudan and another was from Philippine. Diagnosis of cystine was based on chemical method of analysis. Cystine stones were found in nine male (19 stone events) and six female ratio 3:2 with a mean age ± SD of 28.7 ± 10.2 years (range: 3:40). Twenty one stone were located in the kidney and 20 were located in the ureter. Bilateral stones were observed in 2 patients while 22 were seen in the left side and 17 in the right side. PH of the urine varies between 5 and 8. Cystine crystal were present in 26.8% of urine specimens while other kinds of crystals (calcium oxalate, phosphate, uric acid) were seen in 10%. Urinary tract infection was present in 31.7% of cases, and E.coli was the commonest organism (12.2%), followed by enterococcus faecalis (7.3%) and P aerogenosa (7.3%). Qualitative analysis for cystine in urine was done in 9 of the 15 patients, 4 were positive (3 were positive on several occasions for each patient, and one was positive in one occasion and negative in the another for one patient). Uric acid and citrate were measured in 24-h urine collection in 7 patients that showed hyperuricosuria in all and hypocitraturia in 4. Serum calcium was normal in all 15 patients while 5 out of 14 patients had hyperuticemia. Stones were faint in KUB in 34%, almost lucent in 10% and almost opaque in 41.5%. Size of the stone ranged from 3 to 35 mm with a mean ± SD of 19.8 ± 9.4. The kidney was obstructed during the majority of stone events (marked obstruction in 29.3%, moderately obstructed in 41.5% and mildly obstructed in 22%) and it was not obstructed in only 7.3%. Seven stone episodes were managed by ESWL only with clear outcome in two and unclear outcome in five. Another stone episode (small) was managed by medical treatment only. The remaining stone events were managed by either one or combined modalities of treatment (PCNL, uretroscopy, open).

Conclusions: Cystine stones, although rare, are present in different areas of KSA. Crystals of cystine in urine is not necessary for diagnosis of stones as these crystals may be not consistently present in urine. The variability of opacity of cystine stones could be explained by the contribution of calcium and other crystals in mixed stones. The stones usually present with kidney obstruction that added to the difficulty of management of this group of patients, the majority of whom are still managed by endoscopic/open intervention rather than ESWL.

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Urinary stones in western Algeria: Study of the composition of 1354 urinary stones in relation to their anatomical site and the age and gender of the patients

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Introduction: The prevalence of urinary stones runs parallel with socio-economic and health level of population. Few data are currently available concerning the characteristics of urinary stones in Algeria. Based on our recruitment of stones derived from the main teaching hospital, Urology Department of Western Algeria, we defined the stone profile in this region of North Africa and its changes in relation to previous data.

Materials and Methods: A series of 1,354 stones derived from Urology Department in Western Algeria was studied by IRTF spectroscopy. Analysis of the results concerned the crystalline composition and anatomical site of the stones and the age and gender of the patients.

Results and Discussion: Conventional surgery is the method of extraction most frequently used with 79.7% of operations versus 0.2% extracorporeal lithotripsy. The male/female ratio has remained almost constant at 2.23. The anatomical site has changed with a predominance in the upper tract (77.4% of stones). The proportions of whewellite and wedellite have increased compared to our first series, from 48.1% to 50.3% and 13.1% to 16.7% respectively, while phosphates decreased from 24.4% to 16.7%. The presence of struvite has not decreased over the recent years, as 28.8% of stones contain this type of crystal. Anhydrous uric acid had slightly increased to 8.8% versus 6.2%. The proportions ammonium urate and crystine have not changed (1.8% and 0.7% respectively), but ammonium urates forms in less frequently the nucleus of stones than previously (2% versus 5.8%). The study of the nucleus showed that phosphates are predominant in 48.6% of cases versus 35.6% for oxalates. Carbapatite and struvite are more frequent in women, found in 44.6% and 3.7% of cases, respectively. Calcium oxalate is predominantly found in the upper urinary tract (70.9%) rather than in the bladder (48.3%), regardless of gender. Calcium phosphate is more abundant in the upper tract of females with 23.7% of cases versus 10.7% in the bladder. It is equally distributed between the bladder and the upper tract in males (13.2% respectively). Examination of the side affected by stones showed a predominance of the left side in both sexes.

Conclusions: Analysis of these data shows that urinary stones in Western Algeria are tending to evolve in the same direction as in industrialized countries, but urinary tract infection remains a frequent cause of stones.

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Do patients with recurrent cystine calculi always form stone of the same composition?

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Introduction: One third of patients with cystinuria have stones that are mixed of cystine and other crystals. Such mixed stones may respond differently to lithotripsy based on the relative contribution of cystine. We studied the stone composition in patients with recurrent cystine stones to evaluate whether same patient can have calculi of different composition during different stone episodes.

Materials and Methods: 15 patients (pts) treated for cystine stones are the subject of this study. Stone fragments retrieved were analyzed by chemical method. These were 9 males and 6 females with main age ± SD of 28.7 ± 10.2 years (range: 1–40). There were 41 stones events in this group of patients. A stone event is defined as one treated episodes of stone disease. We studied the composition of the calculi during each stone event. We then correlated the stone composition to the degree of opacity of the calculi in plain x-ray, the type of crystals in urine and the 24-h urine metabolic work up.

Results: 8 patients had single stone events (group 1) and each of the remaining 7 had several stone events at different times (group 2). Stone analysis in group 1 showed 20% cystine in 5 pts, 60% in 1, 80% in 1 (mixed stones) and 100% in 1. The second main crystal in mixed stones was oxalate (20–70%) that was seen in 5 pts. Uric acid was seen (70%) in one case, calcium (5–10%) in 6 and phosphate (5–30%) in 4. In group 2, 2 pts had 100% cystine in all of the 9 stone events while the remaining 5 pts had variable percentage of cystine (20–100, median 80) in 23 of 24 events while no cystine was seen in one stone event. Oxalate (10–50%, median 10) was seen in 17 stone events, calcium (5–70%, median 10) in 16, phosphate (5–10%, median 5) in 6, magnesium (3–10%, median 10) in 3 and urate (2%) in one stone event. 31.3% and 24% had cystine crystals in urine in patients with pure cystine stones and mixed stones respectively while 56.3% and 68% did not have any kind of crystals in the 2 groups respectively. 18.8% and 56% had opaque calculi in patients with pure cystine stones and mixed stones respectively while faint opaque calculi were seen in 62.5% and 40% of the 2 groups respectively.

Conclusions: Individual patients with cystine stone disease can have calculi of variable composition with different percentage of cystine at different stone events. This may have an impact on the response of these stones to lithotripsy. Further work up to predict this kind of variability and to assess treatment response may improve the outcome of these difficult groups of patients. Cystine crystalluria is not necessary to diagnose cystine stone as it is only present in less than 1/3 of patients.

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Effect of drinking parsley leaf tea on urinary composition and urinary stone risk factors

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Aim of the Work: Urinary tract stones are a common worldwide disease with high prevalence (20%) in Saudi Arabia. Many of our patients have traditionally used parsley leaf tea for the treatment and prevention urolithiasis. Due to the lack of studies concerning effects of parsley leaf tea on urine composition, we initiated a study that can offer some evidence-based advice to our patient as well as the medical community.

Patients and Methods: This is a randomized crossover interventional study using 20 healthy volunteers. The first group of 10 subjects drank 1,200 cc of parsley leaf tea for two weeks, while the second group drank at least 1,200 cc of bottled water for the same period. This was followed by a two-week washout period before the two groups were crossed over for another two weeks. During the experimental phase, 24-hour urine samples were collected at baseline, on day 14, and the end of the six weeks period and different urinary parameters were measured and analyzed statistically.

Results: We investigated the effect of parsley leaf tea ingestion on urinary composition and stone forming inhibitors and found no significant difference in the urine

volume, pH, sodium potassium, chloride, urea, creatinine, phosphorous, magnesium, uric acid, cystine, or citric acid.

Conclusions: Offsetting changes in urine chemistry caused by the ingestion of parsley leaf tea led to no net change in urinary parameters that can influence stone formation. Further research is needed to evaluate the effects of parsley leaf tea on urinary parameters in healthy and stone-forming patients.

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Cystine stones: Multi-modality treatment and long term effect on renal function

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Aim of Work: To report our experience in patients with recurrent cystine stones requiring variety of procedures and to assess the impact of this approach on renal function.

Patients and Methods: Between 1997 and 2006, we managed 1646 patients with urinary calculi. 16 (1.0%) patients had cystine stones. The mean age was 26.4 years. The mean follow up was 175 months and stones recurrence rate was (2.4 ± 1.2 stone/year/pt). Of the 69 cystine stones, 39 (56.5%) were renal and 30 (43.5%) were ureteric. All patients had blood sampling for serum creatinine before, after treatment and at regular interval to monitor renal function. Hydration and alkalinization were administrated to all patients as treatment and prevention. ESWL was the initial treatment for renal stone <25 mm. Percutaneous nephrolithotomy (PCNL) was performed for renal stones >25 mm. Ureteric stones were treated initially by ESWL followed by ureteroscopic removal for failed cases.

Results: ESWL was performed for 16 renal stone and only 4 (25%) cleared completely. Ten patients required two or more PCNL procedures (mean 5.2 ± 5.3). Three stones required pyelolithotomy and one stone responded to medical treatment. Of the 30 ureteric stones, 3 passed spontaneously following percutaneous nephrostomy. ESWL was performed for 20 ureteric stones, only 3 responded. Eight patients needed 1 or more ureteroscopic procedures (average of 7.4 procedures/patient). Two impacted upper ureteric stones were treated with ureterolithotomy. The initial mean serum creatinine was (100.5 ± 49.3) and the last one was (115.3 ± 50.8). Four (25%) patients had mild renal insufficiency (120–250 μmol/L).

Conclusion: Cystine stone patients are challenging group of stone formers, requiring multi-modalities treatment. The recurrent episodes of stone formation and the multiple procedures they needed may put them at risk of renal impairment.

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A randomized prospective study of diclofenac only versus tamsolusin and diclofenac in the management of small distal ureteric stones

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Aim of the Work: To evaluate the benefit and efficacy of tamsolusin in increasing the expulsion rate of stones ≤5 mm in the lower third of the ureter.

Patients and Methods: A total of (106) patients of both sexes age range 27–61, who had ≤5 mm stones in lower 1/3 of the ureter were included in the study in 3 Riyadh hospitals. Patients were randomly allocated into two groups: Group I: received analgesia only in the form of 50 mg diclofenac orally when necessary. Group II: in addition, they received tamsolusin 0.4 mg daily. All patients were advised for hydration and were followed up two weekly for a total of one month. At each follow up, KUB done. The date of spontaneous passage of the stones was recorded and any admissions for pain control or surgical intervention that was found necessary.

Results: A total of 106 patients were studied with a male:female ratio of 3:1; 63 in the combination group and 43 in the analgesia group. 47 patients in the combination group passed the stones by 4 weeks (74%) while 17 only passed the stones in the analgesia group (39%). Surgical intervention and admissions: there were 4 cases of surgical interference in the combination group: 2 (ESWL), 2 ureteroscopy and 2 admissions for pain control. While there were 4 cases of surgical interventions in the analgesia group: 2 ureteroscopy x 2 DJ stent insertion with 1 and missing for pain control.

Conclusion: The use of alpha-blocker, tamsolusin, seems to significantly increase the rate of expulsion of small distal ureteric stones in both sexes. However, the study shows no significant difference in the rate of admissions or the need for surgical interventions.

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Minimal invasive surgery in complicated and high risk patients with hepatobiliary stones

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Introduction: To review our experience in managing complicated and high risk patients with hepatobiliary stones.

Methods: A total of 14 patients presented with hepatobiliary stones. Three (3) with gall bladder stones, nine (9) with common bile duct stones and two (2) presented with multiple intrahepatic duct stones. All patients underwent minimally invasive intervention, including ESWL, Endoscopic Laser Lithotripsy and stone manipulation. All except one patient were managed with Local analgesia or intravenous sedation.

Results: Only three (3) out of six (6) patients had a successful ESWL. Percutaneous endoscopic stones management carried out for 8 patients, including 3 managed with Holmium YAG Laser.

Summary and Conclusion: Complicated and high risk patients with hepatobiliary stones could be managed with minimally invasive intervention without subjecting them to a major risky procedure. Percutaneous endoscopic management of stones in the hepatobiliary system is safe and feasible.

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Computed tomography scanning reconstructed reformatted imaging for multiple renal stones detection

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Objective: To evaluate the ability of helical computed tomography (CT) scanning with its reconstructed reformatted images to delineate the calyceal stones and to draw an accurate map of the staghorn renal stone inside the pelvi-calyceal system and the benefits gained for an open renal stone surgery when the intravenous urography is contraindicated or inconclusive.

Patients and Methods: Fourteen patients having unilateral multiple renal stones: one huge multiple branched staghorn pelvic stone with multiple calyceal stones. One patient had bilateral renal and calyceal stones. The fourteen patients were males with a mean age of 41 ± 11 years. For different indications, all patients were subjected to a helical CT scanning with reconstruction of reformatted coronal and sagittal films at the CT workstation to assess calyceal stones as regard their site and number. The staghorn stone was configurated inside the pelvi-calyceal system. All patients underwent pyelolithotomy with removal of calyceal stones without utilization of any intra-operative stone-localizing imaging techniques. All patients had post-operative ultrasound and/or CT-scan within one month of assessment to investigate for residual stones.

Results: CT-scan reformatted imaging in the coronal section delineates the staghorn stones in the renal pelvis and their calyceal extensions in the fifteen involved kidneys. On observation of the sagittal serial images for the kidney on the CT monitor, both the stones's number and size in the anterior calyces and posterior calyces were detected precisely with a stone-detection rate of 91.2% when compared to the operative and post-operative imaging. In all procedures, pyelolithotomy only was done without the need for any nephrotomy with a stone-free rate was 40% of the cases. The renal pelvic stone could be delivered as planned pre-operatively so that the shorter calyceal stone extension was delivered first followed by delivery of the longest one. Calyceal stones, not detected by reformatted films, were more common in the lower renal calyces than in the middle and upper calyces being 10.6%. Calyceal stones, not detected by the reformatted CT films commonly occurred in stones less than one centimeter in diameter especially in presence of multiple overlapping stones.

Summary and Conclusion: Helical CT scanning in its reconstructed reformatted images is evidently helpful in precise delineation of the configuration of huge renal pelvic stones and detection of associated renal calyceal stones in case of radiolucent stones and when contrast injection is contraindicated. It helps to make pyelolithotomy least traumatic by placing a pre-operative scenario for delivery of the staghorn stone and time-saving by direct extraction of the pre-determined calyceal stones as surgeon becomes well-oriented with stones' site and number.

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Quality of life in patients after urolithiasis

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Introduction: This study was designed to evaluate the health-related quality of life (HRQOL) of patients who had undergone lithotripsy for treatment of urinary stones and to identify factors that significantly affect the HRQOL of these patients.

Materials and Methods: A comparative cross-sectional study was performed at the main university and main Ministry of Health hospitals in Riyadh, Saudi Arabia. All patients admitted to the urology services (275) and who underwent lithotripsy for urinary stones during a 9-month period were included in the study. An observation period of 3–15 months following the last treatment was allowed before patients completed the QOL questionnaire. Information on socio-demographic and medical characteristics, and number and type of lithotripsies were collected. The Medical Outcome Study Short-Form 36-item survey (SF-36) was used to assess HRQOL. For comparison, the HRQOL, in an equal number of healthy individuals was investigated, multivariate analysis of variance was used for comparisons between groups.

Results: Included patients had undergone PCNL (97, 35.3%), ureteroscopy (118, 42.9%) and ESWL (60, 21.8%). Compared with healthy subjects, lithotripsy patients had significantly higher mean scores in the different subscales of the SF-36 questionnaire such as physical functioning, vitality, role-physical, role-emotional and mental health, indicating a better HRQOL. Compared with patients who underwent ureteroscopic or extracorporeal shock-wave lithotripsies, those who underwent percutaneous lithotripsy had significantly worse mean scores for all the SF-36 scales, except for body pain. Factors impacting HRQOL of the patients were age, obesity, diabetes mellitus, and stone characteristics such as localization (in the kidney) and recurrence (multiple lithotripsies).

Conclusion: Post-lithotripsy, patients have a favorable HRQOL compared with healthy volunteers. Further prospective studies are warranted to confirm these results owing to the inherent limitations of the cross-sectional design and backward analysis of this study.

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Renal hematoma after slow rate shock wave lithotripsy

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Introduction: This prospectively study aims to determine the incidence of perinephric hematoma after receiving slow rate SWL and the risk factors that may promote the formation of the hematoma.

Methods: All the patients undergoing slow rate SWL (60 shocks per minute) for the treatment of renal stones from May 2007 till August 2006 were prospectively evaluated. After determining age, sex, body mass index, side and site of the stone, number of prior SWL treatments for the ipsilateral side, history of bleeding disorders, use of NSAIDs or anticoagulant drugs prior treatment session, complete blood count, creatinine level, coagulation profile, presence of UTI or urinary obstruction, mean BP, anesthesia type, number shocks delivered and the total energy. All under patients had an ultrasound on the ipsilateral renal unit done one day before and one day after SWL session to evaluate for hematoma formation.

Results: 120 cases of slow rate SWL were done. 53 of them met study criteria, 39 male and 14 female and their ages range between 20 years to 77 years and the mean age was 44 years, the number of shocks delivered was between 1688 to 7000 and the mean was 4491, the total energy was between 11816 to 42000 and the mean was 30141, while 7 complain of excessive pain post treatment and 2 complain of significant hematuria.

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Comparison of I.V. lornoxicam and fentanyl on analgesia during extracorporeal shock wave lithotripsy

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Various sedatives and analgesic medications have been used for shock wave lithotripsy (SWL). This study

compares the analgesic and side effects of IV Lornoxicam and that of I.V. Fentanyl in ESWL. One hundred patients were randomly divided into two groups, group A (n = 50) received 16 mg. Lornoxicam I.V. 30 minutes before ESWL and group B (n = 50) received 2 ug/kg Fentanyl I.V. 3 minutes before ESWL. Pain intensity was evaluated on a visual analog scale (VAS). A supplement analgesia with I.V. Fentanyl 25 ug was given when complained of pain, changed position or grimaced in response to shock waves. The level of sedation was determined, using the observer. Assessment of alertness/sedation (OAS/S). Oxygen supplement through a face mask was given when Sp02 fell below 94%. Side effects (nausea, vomiting, dizziness) and the time of discharge from post anesthesia room (PAR) were recorded.

There were no differences between two groups in the demographic data, number of shock waves duration of ESWL, procedures, and Fentanyl supplement. The incidence of oxygen supplement was lower in Lornoxicam group (5/50) compared with that of Fentanyl group (20/50), $p < 0.01$. The frequency if dizziness was lower in Lonoxicam group (3/50) than in Fentanyl group (15/50), $p < 0.01$. Five patients in Fentanyl group complained of nausea, but two did in Lornaxicam group. The discharge time from PAR was significantly shorter in Lornoxicam group (24.4 ± 3.23 min) than that in Fentanyl group (37.14 ± 5.82 min), p0.01.

Conclusion: Intravenous lornoxicam could provide an adequate analgesia as good as fentanyl but with a lower incidence of desaturation, nausea/vomiting and dizziness and could be discharged from PAR earlier. Therefore, we suggest that intravenous Lornoxicam is safe and effective regimen for pain relief in ESWL.

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Holmium: Yattrium-aluminum-garnet laser ureterolithotripsy versus extracorporeal shock wave lithotripsy in treatment of proximal ureteral calculi

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Aim of the Work: To compare the safety and efficacy of extracorporeal shock wave lithotripsy (ESWL) (Dornier Medical Systems) and ureteroscopy with intracorporeal Holmium: Yag Laser lithotripsy for proximal ureteral calculi.

Patients and Methods: A total of 33 patients (males: 21, and females: 12) with a mean age of 40.4 ± 12.3 years having proximal ureteral calculi underwent in situ ESWL with a DoLI 50 lithotripter (Dornier Medical Systems, Inc.) under intravenous sedation, or ureteroscopy combined with holmium: YAG laser lithotripsy under spinal anesthesia on an inpatient basis. A successful outcome was defined as the patient being stone free on radiography 1 month after treatment. The stone size, success rate, postoperative complications, and cost were evaluated in each group.

Results: A total of 33 patients were enrolled in this study. Hematuria and flank pain were the most common complaints. Proximal ureteral calculi were less than 1 cm. in 18 patients (54.5%) and were 1 cm. or greater in 15 patients (45.5%). The initial stone-free rates with stones less than 1 cm. were 100% and 80% for ureteroscopic laser lithotripsy and ESWL, respectively. The initial stone-free rate in patients with calculi 1 cm. or greater was 88% for ureteroscopic laser lithotripsy and 57% for in situ ESWL. There were no major complications in either group.

Conclusions: Our study demonstrates that ureteroscopy combined with holmium: YAG laser lithotripsy is an acceptable treatment modality for all proximal ureteral calculi and excellent results are achieved for calculi 1 cm. or larger. Although the stone-free rate was better for smaller stones with ureteroscopic laser lithotripsy, ESWL should remain first line therapy for proximal ureteral calculi less than 1 cm. because of less morbidity, and a lesser anesthesia and analgesic requirement.

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Efficacy of local subcutaneous anesthesia versus intramascular sedation in extracorporeal shock wave lithotripsy: A prospective randomized trial

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Introduction: To evaluate the analgesic efficacy and utility of local subcutaneous (SC) anesthesia compared with routine intramuscular (IM) sedation during extracorporeal shock wave lithotripsy (ESWL) in a prospective randomized study.

Methods: Of 133 patients included, 69, 34 and 30 received a single, 2 or more than 2 treatment sessions respectively. The patients in each treatment session were randomized to receive either IM Demerol (Group A) or SC infiltration of 10 ml. 2% Lidocaine HCL and 10 ml. 0.5% Pupivacaine at the area of entry of the shock wave marked by the Urologist (Group B). The degree of pain was rated by the patient using a 5-point visual analog scale.

Results: Of 133 patients, 92 (69.2%) were males and 41 (30.8%) were females. The mean age (SD) was 47.6 (12.5) years with a mean (SD) body mass index of 28.16 (4.67). Group A comprised 89 treatment sessions while 87 were involved in Group B. Both groups showed no statistically significant differences regarding various patients, stone or treatment parameters. In 81 treatments in Group A (91%), the entire procedure was performed with no, minor or tolerable pain (pain score 1.97 ± 1.12). Of the 87 patients in Group B, 81 (93.1%) suffered no, minor or tolerable pain (pain score 1.60 ± 1.17). In 2 (2.5%) and 4 (4.6%) patients in Groups A and B respectively, ESWL was interrupted because of intolerable pain and adjunctive IV sedation was given. However, pain scores were significantly lower for Group B ($p = 0.035$).

Summary and Conclusion: Local subcutaneous anesthesia alone is both efficient and safe for analgesic purposes during extracorporeal shock wave lithotripsy.

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Shockwave lithotripsy versus semi-rigid ureteroscopy with pneumatic lithotripsy for symptomatic proximal ureteral calculi

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Purpose: To compare the efficacy and safety of semi-rigid ureteroscopy with lithotripsy with shock wave lithotripsy (SWL) for proximal ureteral stone.

Methods: A total of one hundred patients with solitary, radiopaque upper ureteral stone were randomized to either SWL or URS after an informed consent that included possible conversion from one treatment modality to the other. A total of 44 patients underwent SWL treatment on outpatient basis using Dornier Lithotripter S and 46 patients underwent URS which was performed using semi-rigid ureterorenoscope with or without pneumatic lithotripsy. A successful outcome was defined as the patient being stone free on radiography within 3 months after treatment. The stone size, operative time, stone free rate, efficacy quotient as well as postoperative complications, were reported in each treatment group.

Results: There were no significant differences between the two groups regarding baseline characteristics. The mean operative time was longer in the URS than SWL group (P 0.001). For calculi less than 1 cm, the initial stone-free rate was 94.4% for URS and 80% for SWL with an efficiency quotient of 0.89 and 0.69 respectively. For calculi 1 cm or greater, the initial stone-free rate was 92.2% for URS and 66.6% for SWL with an efficiency quotient of 0.87 and 0.43 respectively. The overall stone-free rate for URS group was 93.4% for URS and 72.7% for SWL, with an efficiency quotient of 0.87 and 0.53 respectively. No major complications were reported in SWL group. In URS group ureteral perforation, febrile UTI and severe hematuria had been reported in one case each (2.1%).

Summary and Conclusion: Semi-rigid URS with pneumatic lithotripsy is more efficient compared to SWL for proximal ureteral stones 1 cm and larger with acceptable complication rates. For stones less than 1 cm, although SWL achieved stone-free rates lower than URS, yet it should be the first line therapy for this group based on its high stone free rates, less invasive nature, as well as avoidance of anesthesia and prolonged hospital stay.

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Tubeless percutaneous nephrolithotomy

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Objective: If post PNL nephrostomy tube should be used as a routine or restricted to a certain situations.

Patients and Methods: Between July 2004 and December 2006, 121 patients (123 renal units) with renal stones of

18–70 mm (mean 31.19) size underwent PCNL. Eighty-two were males while 39 were females. Their ages ranged between 4 and 80 years (mean 37.27). As regard to stone site, it was 58 patients in right side and 65 patients in left side. To the end of procedure, no nephrostomy tube was left in any patient.

Results: The PCNL was done under general anaesthesia. One hundred ten were done while the patient was in prone position while 13 were done in supine position. The approach was subcostal through the lower calyx in 110 kidneys and supracostal through upper calyx in 5 kidneys while middle calyx in 8 kidneys. Single puncture was 114 while double was in 8 and triple in 1, with total of f133 punctures. Success rate was 96.74% while stone free rate was 86.18%. Operative time was between 15 and 100 minutes (mean 46.30). Blood transfusion was needed in 5 patients with blood loss ranged between 0.3 and 4 g (1.57 g). No nephrostomy tube was left with only ureteric catheter no. (6–7) was left 7–72 hrs. (45.67). Average hospital stay was 50.69 hours. As regard postoperative complications, they were in the form of minimal collect in 3 patients, mild collect in 4 and leakage in 2, postoperative fever in 5 and haemothorax in 1, while no injury to adjacent organs.

Conclusions: Post PCNL nephrostomy tube is the standard.

Tubeless PCNL is a good option provided that: No much bleeding, no need for second look, operative time is not more than 2 hours and no more than 3 punctures.

Tubeless PCNL has the advantages of decrease hospital stay, decrease postoperative pain, and no need for analgesia, with acceptable postoperative complications.

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Percutaneous nephrolithotomy: Experience with a novel position

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Objectives: Prone position in PCNL is time consuming and very cumbersome for both the urologist and the anesthetist. We report our experience in PCNL via a new position which is the flank position.

Patients and Methods: During the last year, nine patients, 5 males and 4 females, mean age (SD) of 48 (14.3 years) with unilateral renal stone disease were subjected to percutaneous stone removal via a flank position. All patients were prepared in standard fashion. A percutaneous access tract was established in radiology department the day before surgery.

Results: Twelve procedures were performed in the nine patients. All the procedures were performed by a single surgeon (H.A.M.). Stones were on the right side in 5 patients and on the left side in 4, occupying more than one calyx in 6 while 2 were in the lower calyx and one in the renal pelvis. All the stone but one were opaque. Stone were new-onset in 6 patients, recurrent in 3, single in 4 and multiple in 5. Mean (SD) stone length and width were 25.5 (8.33) and 19.17 (6.34) mm, respectively. Six renal units showed partial obstruction as indicated by IVU, Renal US and/or CT scan. Preoperatively all patients had a sterile urine culture and within normal coagulation profile. Nephrostomy access was created via the lower calyx in 8 patients, the middle calyx in 3 and upper calyx in one patient. Mean (SD) operative time was 77.38 (22.92) min. Intraoperatively, fluoroscopic monitoring of tract dilatation was very easy. Bleeding was encountered during tract dilatation of one patient but no blood transfusion was required. Complete clearance of the stone was encountered in 7 (77.8%) patients. Two patients had residual stone, one had ESWL. Finally, 8 patients (88.9%) were completely stone-free and one (11.1%) had insignificant residual for no intervention.

Conclusion: PCNL through a flank position is feasible, allows good radiological monitoring of the procedures and less cumbersome for Urologist and Anesthetist.

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Contemporary management of staghorn stones, King Saud University experience

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Objective: To review the efficacy and safety of percutaneous nephrolithotomy (PCNL) in patients with staghorn stones at King Khalid University Hospital in Riyadh.

Materials and Methods: A total of fifty two renal units with staghorn stones underwent PCNL by one surgeon. They were retrospectively reviewed between January 2005 and December 2008. Stone burden, mean body mass index, previous failed procedures, and risk factors for stone formation were reviewed. Stone free rates defined as stone size of 3 mm or less based on KUB, non-contrast CT, assessed at a base of three months follow up postoperatively.

Complications and the need of ancillary interventions were recorded.

Results: A total of fifty two renal units had PCNL for staghorn calculi, 29 of them were complete staghorn stones, whereas 23 were partial staghorn stones. The mean stone burdens were 12.7 cm^2 with of SD 8.3 cm^2. Mean surgery time was 182 minutes with SD of 61 minutes. Single tract PCNL was used in 60% of the cases, while 40% needed multiple tracts. Subcostal punctures were performed in 73% of the cases, whereas 14% of them has supracostal punctures and 14% needed both subcostal and supracostal punctures. Intracorporal lithotripsy modalities used for stone fragmentation were electrohydrolic lithotripsy (EHL), combination ultrasonic and pneumatic lithotripsy, and Hol-YAG laser lithotripsy in 9.6%, 100%, 29% of the cases respectively. Ancillary procedures like stenting, second look nephroscopy, and antegrade ureteroscopy were performed in 44%, 45%, and 1.9% of the cases respectively. Complications were leakage after discharge, urosepsis, hydrothorax, atelectasis, obstruction and postoperative transfusion were found in 25% of the cases. After three months follow up, 80.4% of the patients were stone free.

Conclusion: PCNL is a safe and effective treatment option for patients with staghorn calculi.

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Ercutaneous nephrolithotomy for large and complex renal stones

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Objective: Percutaneous nephrolithotomy (PNL) is a well established technique for removal of large and/or complex renal calculi. We outline our experience with this technique.

Materials and Methods: Between March 2007 and October 2008, 58 renal units were treated with PNL (either alone or with SWL) for large and/or complex renal stones.

Results: Patients' mean age was 49.3 yrs (11–81 years), eighty nine percent of them were males. Renal stones were single in 53%, multiple in 47% and staghorn stone in 6% of patients. Fifty nine percent of these stones were radio-opaque and 41% were lucent stones. The procedure was completed in a single session in 82% and multiple sessions in 18% of cases. Stone clearance was accomplished by PNL alone in 74% and in combination with SWL in 26% of patients. Overall stone free rate was 94% (82% for PNL alone). Complication rate was 8% (blood transfusion in 2 cases, persistent leak in 6 cases and perforation in one case).

Conclusion: PNL is an accepted technique for management of large and complex renal stones. Decreased overall stone free rate and increased complication rates with increased stone surface area. Multimodal approach should be thought of for large and complex renal stones.

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Modified tubeless versus conventional nephrostomy tube drainage following percutaneous nephrostolithotomy

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Introduction: Tubeless renal surgery has been advocated recently by many investigators avoiding external nephrostomy tube drainage but still depending on double J ureteral stent with its bothersome symptoms. However, we compared postoperative outcomes between modified tubeless drainage "without double J stent" and conventional large bore nephrostomy drainage following percutaneous nephrostolithotomy (PCNL) in a prospective randomized fashion.

Methods: 30 patients undergoing PCNL were randomized to receive either conventional large bore (20 Fr) nephrostomy drainage (first group GI, n = 15 patients), or no nephrostomy drainage (second group GII, n = 15 patients) without application of double J ureteral stent. Inclusion criteria included a single subcostal tract, uncomplicated procedure, normal preoperative renal function and complete stone clearance. Factors compared among the two groups were postoperative analgesia requirement, duration of haematuria, duration of urinary leak, mean postoperative hemoglobin concentration and percent of its decrease and hospital stay together with return to normal activity.

Results: The mean postoperative analgesic requirement was significantly higher in GI patients compared to GII patients ($P < 0.01$). GII patients (group 2) had a significantly shorter mean duration of urinary leak through the percutaneous renal tract compared to GI patients to be 6.3 ± 05.8 hours and 36.4 ± 13.5 hours respectively ($p < 0.05$). Hospital

stay was significantly shorter in GII patients to be 2.5 ± 1.4 compared to GI patients who had 4.6 ± 0.77 days ($p < 0.05$). The two groups were similar in terms of operative time, duration of haematuria and mean postoperative hemoglobin concentration. Postoperative ultrasound did not reveal significant extravasation in any case.

Summary and Conclusion: Modified tubeless PCNL is associated with less postoperative pain, urinary leakage and hospital stay. It is a promising procedure for management of non-complicated renal stones. GII patients had shown lesser analgesia requirements, and earlier return to work and normal activities compared to GI patients. Additionally, many patients who initially refused a percutaneous procedure because of the need for a nephrostomy tube and hospitalization have reconsidered the procedure after our medications in the technique.

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Percutaneous nephrolithotripsy: Single institute experience

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Aim of the Work: To assess the outcome of PCNL in a single institute.

Patients and Methods: We reviewed 62 renal units in 55 patients who underwent PCNL from January 2004 till the end of 2006. PCNL was done in large stone burden, multiple stones, anomalous kidneys and recurrent kidney stones post open surgical removal in which ESWL is not preferable. All were done after inserting a retrograde ureteral catheter after which the patient will be put into prone position. Fluoroscopic guided punctures were made by the urologist followed by tract dilatation. When multiple tracts are anticipated, all punctures were made at outset and replaced by wires were put into the collecting system or ureter. The stones are removed by pneumatic fragmentation and grasper after which antegrade ureteral stent. Foley's catheter and nephrostomy tube were inserted during the surgery.

Results and Conclusions: The incidence of postoperative outcome, complications, length of hospital stay, blood transfusion, stone free rate were all reviewed and the results will be presented.

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Ureteroscopic management of distal ureteral calculi in patients with compromised hepatic function

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Objective: To evaluate results of ureteroscopic management of distal ureteral calculi in hepatic compromised patients and to standardize precautions taken to improve the outcomes and minimize morbidity.

Patients and Methods: It was a prospective study concerned with hepatic compromised patients and distal ureteral stones subjected to ureteroscopic management. The patients divided into 2 groups before and after construction of multi specialty team. The standard technique of ureteroscopy was performed under anesthesia.

Results: Mean age of 74 patients was 40 ± 3.7. Causes of hepatic insufficiency were bilharzial periportal fibrosis in 25 and cirrhosis in 49 patients. No aborted procedures due to hemodynamic instability. Direct introduction of the ureteroscope into the ureter without dilation in 56 patients. Mean operative time was 44.1 ± 16.2 min. Seventeen patients were discharged on the next day and the other patients ranged from 2 to 9 days. Simple stone extraction in 30 patients and after lithotripsy in 34 patients. The overall stone free rate was 86.5%, 63.6% in group I while 96.1% in group II. The overall complications were 17.6%, 9.5% operative and 8.1% postoperative one. Preoperative hospitalization was performed for fifty patients in group II. The mean preoperative hospitalization period was 1.6 ± 0.4 days. Recombinant factor VII was given for 2 patients, platelets 3, desmopressin in 3 and Vitamin K in 7 patients, packed RBCs for 5 and 8 patients received albumin infusions preoperatively. Also, postoperative transfusion of packed RBCs, albumin and FFP for readmitted 2 patients.

Conclusion: Ureteroscopic intervention has been considered ideal minimally invasive procedure for management of distal uretral calculi. Hepatic insufficiency is problematic health condition due to fragility of patients, abnormal metabolic pathways and high propensity for urolithiasis. It is difficult to assess *in vivo* hemostasis and reversibility of coagulopathy in this patient population even with normal coagulation profiles as a result of hidden unknown parameters. Hence, preoperative medical evaluation and selective hospitalization for supportive measures and preoperative ureteral stenting is mandatory. We hope for more advances in technology and standardization of protocols for early diagnosis and management of hepatic patients as their prevalence is increasing.

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Synchronous bilateral ureteroscopy for bilateral distal ureteral calculi versus morbidity

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Objective: To evaluate the safety and efficacy of one stage bilateral ureteroscopy for bilateral lower ureteral stones and determine whether the procedure associated with increased morbidity or not.

Patients and Methods: Exclusion criteria were patients with ureteral stricture distal to the stones, complicated UTIs, immune compromised, coagulopathy and uremia. The standard technique of ureteroscopy was used. The method of extraction depends on size, number, amount of speculation, degree of impaction and condition of distal ureter. Methods of extraction were forceps, basket and pneumatic or laser lithotripsy. Success was considered if the stone completely extracted and no need for further procedures.

Results: Mean age of patients was 32 ± 1.9. Ten of 39 were female. Severe colic was the main presenting symptom. The ureteric orifice was dilated in 34 patients. Mean operative time was 44.1 ± 16.2 min. The mean hospital stay was 1.7 ± 1.5 days. The overall stone free rate for 39 patients (82 procedures) was 100%, 37 patients (94.9%) successes from first sitting while 2 patients became stone free from second trail. The mean follow up was 9 months (range: 1–24). Follow up imaging with renal US, excretory urography and/or nuclear renal scan every 3 months after ureteroscopy revealed delayed stricture formation in one patient. No operative or postoperative complications were recorded except false passage in 1 patient, fever in 3 patients and flank pain in 3 patients.

Conclusion: One-stage bilateral ureteroscopy seems to be effective option and the procedure of choice for bilateral distal ureteral calculi in properly selected patients due to higher success rate and fewer risks. Also, it has multiple advantages such as low costs, saving patients from multiple anesthesia and procedures as well as decrease hospital stay. To gain these benefits, auxiliary instruments should be available to enable the urologist to manage complex ureteral calculi disease.

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Safety and efficacy of ureteroscope and holmium yattrium-aluminum-garnet laser lithotripsy for upper tract urolithiasis, King Saud University experience

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Objective: To review our experience with ureteroscopic treatment of upper urinary tract urolithiasis and to assess the safety and efficacy of Holmium YAG laser lithotripsy as a gold standard modality.

Patients and Methods: This is a retrospective review of 226 patients who underwent 267 ureteroscopies at KKUH from October 2004 to December 2009. All procedures were done by single surgeon. Demographics, comorbidities, anatomic abnormalities, stone characteristics, intraoperative details, stone free rates and complications were reviewed.

Results: A total of 267 ureteroscopies reviewed, 244 procedures were done for upper urinary tract stones. Comorbidities were found in 97 cases (36.1%), mostly hypertension in 36 (13.5%) and diabetes mellitus in 28 (10.5%). Anatomic abnormalities were detected in 66 cases (24.7%), obstructive uropathy in 10 (3.7%), duplication in 7 (2.6%), solitary functioning kidney in 5 (1.9%), ureteropelvic junction obstruction in 3 (1.1%), distal ureteric stricture in 4 (1.5%), and others. Metabolic abnormalities were identified in 19 (7.8%), cystinuria in 14 (5.7%), hyperuricemia in one case (0.4%). From the 244 procedures that were performed for stone disease, 104 (42.6%) were done for renal stones, 96 (39.3%) were performed for ureteric stones, and 44 (18%0 were done for multiple renal and ureteric stones. Overall stone free rate was 93.1% in a three months follow up. Complication rate was (4.1%), including inability of accessing the stone in (1.8%), fever in (0.7%), perforation in (0.4%), and urinary retention in (0.4%). No patient was found to have new onset of stricture in the 50 cases who completed 1 year follow up post operatively.

Conclusion: At our institute, ureteroscopy and Holmium YAG laser lithotripsy is a safe and effective modality for managing upper urinary tract urolithiasis.

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The role of flexible ureterorenoscopy with holmium laser in treating renal stone more than 2 cm: New era

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Purpose: We aim to evaluate the use of flexible ureterorenoscope with holmium laser as a minimal invasive procedure for the renal stone greater than 2 cm.

Methods: We evaluated 113 patients (117 renal units) retrospectively with urinary stone mean stone size 26.3 mm (range 20–58 mm) underwent F-URS with holmium laser. Patient age, sex, body mass index, stone size, stone composition, associated lower calyx stone, Double-J stent preoperatively, congenital anomalies, urological history, duration of the intervention and complications were evaluated. The outcome was determined at 4 weeks on KUB and NCCT or by endoscopic second look if needed. The F-URS success was defined as stone free (SF) or remaining fragments (RF) less than 3 mm.

Results: From our data we obtain stone free in 33 renal units (28.2%), residual fragment of 2 mm in 32 renal units (27.4%) and 52 renal units (44.4%) had significant residual fragment after the first session of treatment. The success rate for F-URS was 55.6%, 83.8% and 93.2% at the first, second and third session of F-URS respectively. Five renal units (4.2%) had no further treatment and they were been considered as treatment failure. No major complications were reported.

Summary and Conclusion: The use of F-URS with holmium laser in renal stone greater than 2 cm is effective and safe. This technique could be proposed for the patient with low volume complex renal stone as one of the modalities of treatment as it has excellent results, low rate of complications and brief hospital stay.

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Ureteral stenting before ureteroscopy benefits, disadvantages, and outcome

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Objective: To investigate the disadvantages and the benefits of placement of a double-J stent in the ureter before ureteroscopic manipulation of some ureteral lesions in certain situations in adult patients.

Patients and Methods: Sixty-eight (68) adult patients with ureteric pathologies were included in this study. Patients were 56 males and 12 females with a mean age of 41.6 ± 19.3 years. All patients had a double-J stent placed in the ureter for 2–8 weeks for different indications. Ureteroscopy was done later as a second-stage procedure to deal with the ureteral pathology. Sixty-five (65) patients had ureteral stones at different levels and underwent stone retrieval or lithotripsy. Two (2) had pelvi-ureteric junction obstruction and underwent endopyelotomy. One female patient had a uretero-uterine fistula and underwent ureterotomy and dilatation. The semi-rigid Wolf's ureteroscope (9.5 F) was used in all procedures.

Results: During the period of preliminary stenting, twenty-nine (29) patients had recurrent attacks of hematuria (42.6%) while thirty-three (33) patients developed frequency and dysuria (48.5%). Two (2) patients had distal migration of the stent into the bladder and urethra (2.9%). All patients were treated conservatively. Bollous edema was encountered in eleven (11) cases (16.2%) that disappeared by the end of the procedure. All patient had ureteroscopy placed without intramural ureter dilatation. The success rate to deal with the pathology was 94.1%. Complicated ureteroscopy occurred in six (6) cases (8.8%). There were no major ureteral injuries. Minor injuries occurred in two (2) patients (2.9%): one minor perforation and one significant bleeding but both procedures were completed. Stone migration was encountered in four (4) patients who had upper ureteral stones. Forty-seven (47) patients had a ureteral catheter (6F) inserted after the procedure. Complicated cases, cases with stone migration, and the three (3) patients with pelvi-ureteric junction obstruction and fistula had a second ureteral stent inserted for 8–10 weeks. The mean time of the procedure was 25 ± 6 minutes.

Summary and Conclusion: Pre-ureteroscopic stenting of the ureter causes passive ureteral dilatation. This

provides a better endoscopic anatomical environment that paved the way to a more safe and faster semirigid ureteroscopy for management of ureteral lesions especially uretral stones. All stent-related side effects could be conservatively managed. Migration of upper ureteral stones is more common in the passively dilated ureter and it is better to fix the stones by any means before performing lithotripsy.

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How do you choose ureteral access sheath for your flexible ureteroscope?

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Introduction: Ureteral access sheaths (UAS) were developed to facilitate the passage of flexible ureteroscope (FURS). Nevertheless, with all existing UAS and FURS, it is important to determine the compatibility between them. We aimed to create a recapitulative tool to help the urologist to choose the right UAS for each FURS.

Materials and Methods: We evaluated external diameter of 9 different FURSs in a multiperforated "French Catheter Scale" and we tested FURS free passage through 18 UASs. Results were reported in a double-entry cable.

Results: UAS internal diameters are currently available from 9.5 Fr to 13 Fr. External diameter of FURS fluctuates from 8.4 Fr for the smallest (Storz Fex-X2) to 10.9 Fr for the biggest (Olympus URFV). Moreover, diameter of some FURS varies from tip to proximal part. A minimal of 11 Fr diameter is required to pass all types of FURS. We noticed that all FURS could get through Boston Navigator 11 Fr UAS as well as UASs with external diameter of 12 Fr except Bard Aquaguide where the 13 Fr UAS is needed, due to its special shape. 5 Fr Cook Flexor can only be used with Storz Flex-X2. A minimum of 10 Fr diameter UAS is necessary to allow passage of digital Storz Flex-X2.

Conclusion: Only fibre-optic Storz Flex-X2 can get through all existing UAS. The smallest UAS that can be used with FURS is the Boston Navigator 11 Fr.

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Efficacy and safety of semi-rigid ureteroscopy and pneumatic lithotripsy in treatment of radiolucent proximal ureteral calculi

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Introduction: To evaluate the efficacy and safety of semi-rigid ureteroscopy with pneumatic lithotripsy in the treatment of radiolucent proximal ureteral stones.

Materials and Methods: In this prospective study, a total of 40 patients with solitary, radiolucent upper ureteral stone underwent semirigid ureteroscopy. Ureteroscopy was performed using semi-rigid uretero-renoscope with or without pneumatic lithotripsy. A successful outcome was defined as the patient being stone free on non-contrast computed tomography within 1 month after treatment. The stone size, operative time, stone free rates, efficiency quotient as well as post-operative complications, were reported.

Results: Mean operative time was longer in URS for calculi >1 cm (65 ± 35 min) than for calculi <1 cm (35 ± 24 min). For calculi less than 1 cm, stone-free rate was 94.1% with an efficiency quotient of 0.88. For calculi 1 cm or greater, the initial stone-free rate was 86.9% with an efficiency quotient of 0.76. The overall stone free rate, regardless of stone size, was 90% with an efficiency quotient of 0.81. Failure to reach the stone and upward stone migration represent 17.5% of recorded complications, UTI represented 15%. Ureteral perforation and urosepsis, one case each, represented the major complications reported.

Conclusion: Semi-rigid ureteroscopy with pneumatic lithotripsy is an effective and safe treatment modality for radiolucent proximal ureteral calculi with acceptable complication rates.

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Lower pole renal stone management using flexible ureterorenoscopy with holmium laser (multi-centric study)

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Introduction: ESWL is the first line of treatment for lower pole renal stone less than 2 cm; however, results are not optimal due to the anatomical variants and the dilemma of fragments elimination. We evaluate the safety and efficacy of flexible ureterorenoscopy with holmium laser in the management of lower pole renal stone.

Materials and Methods: We retrospectively reviewed the records of 199 patients who underwent F-URS using holmium laser from 2004 to 2010. Renal stone burdens were classified as group 1 (1–10 mm), group 2 (11–20 mm) and group 3 (more than 20 mm). Endoscopic staged-therapy was required in case of uncompleted stone fragmentation or large stone burden. Different variables were evaluated: age, sex, body mass index, stone size, stone composition, renal function, infundibulum length (IL), infundibulum width (IW), infundibulopelvic angle (IA) and presence of hydronephrosis. Treatment success was defined as stone-free or residual fragments less than 2 mm. Follow-up visit ranged from 4 to 6 weeks with a plain radiograph (KUB) and either a renal ultrasound or a non-contrast CT scan (NCCT).

Results: Treatment success was obtained in 95%, 78% and 40% of groups 1, 2 and 3, respectively. Endoscopic retreatment (Staged-therapy in 2 sessions) increased the success rate up to 86.4% in group 2 and 82% in group 3. Success rate was rendered in 93.5% of patients. Stone size, infundibulum length and width were the most statistically significant predictors of failure. Mean operative time ranged from 30 to 160 minutes (mean operative time was 48 minutes). No major complications were reported.

Conclusion: Flexible ureterorenoscopy offers a safe and effective minimally technique for lower pole renal stone with average burden of 15 mm. Patients with large stone burden should be informed about staged therapy. Anatomical variants may affect the success rate; therefore, alternative techniques should be discussed with the patients.

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Retrograde endoscopic management of stone-bearing caliceal diverticula

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Introduction: Symptomatic Stone-bearing caliceal diverticulum management is considered as a challenge in urology. Our purpose is to evaluate the outcome of retrograde endoscopic surgery using flexible ureterorenoscopy (F-URS) with holmium laser in managing this pathology as a minimally invasive technique.

Materials and Methods: We retrospectively reviewed the records of 41 patients who underwent F-URS using a holmium laser from 2004 to 2010 for symptomatic stone-bearing caliceal diverticula. The presenting symptoms were renal colic, urinary tract infection, or hematuria. F-URS was used in 33 patients (80%) as an alternative after failure of shockwave lithotripsy (SWL). Retreatment was needed in three patients. Retreatment indication was uncompleted stone fragmentation in 2 patients and failure to identify the diverticulum in one patient. The follow up visit ranged from 4 to 6 weeks with KUB and either renal ultrasonography or non-contrast CT.

Results: Patients who were included in the study were 41: 22 women and 19 men (mean age 45.7 years; range 18–72 years). From our date, 34 patients (83%) were rendered stone free and residual fragments (RF) were found in seven patients (17%). Success rate was considered as SF or residual fragment less than 2 mm. In total, 34 patients (90%) were symptom free postoperatively.

Conclusion: F-URS using holmium laser is a very effective, minimally technique. It could be the best option in managing stone-bearing calyceal diverticula, especially in case of SWL failure. The development of actively deflextable ureteroscope with miniaturization allowed us to obtain a high success rate in this pathological entity associated with low morbidity and a brief hospital stay.

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Percutaneous nephropexy: Experience of Farwania Hospital, Kuwait

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Aim of the Work: Renal ptosis is a not an infrequent cause of renal pain in our practice. It represented 3.6% of the underlying causes of acute renal crises in female patients as in previous study carried out in Farwania Hospital. The management varied

between: conservative measures, which were not successful in about 50% of the cases, open nephropexy and laparoscopic nephropexy. In this era of minimally invasive surgeries, this study was conducted to evaluate the outcome of percutaneous nephropexy (PCNP). The idea of PCNP is to fix the kidney by the scar created at the site of PC nephrostomy tube insertion.

Patients and Methods: Since October 2005, twenty three female patients presented to Urology Unit, Farwania Hospital, with acute renal pain due to mobile kidney proved by IVU in supine and erect positions. Twelve of those patients agreed to have PCNP. Post operative IVP was performed 3–6 months after the operation, in both supine and erect positions. The patients were followed up at least 6 months post operatively for evaluation of the degree of improvement of their symptoms.

Results: Ten patients reported complete cure of their symptoms after the procedure while 3 patients achieved significant improvement. Post operative erect IVU showed no significant ptosis in all cases after the procedure of PCNP.

Conclusions: Percutaneous nephropexy is a valid minimally invasive treatment for cases with symptomatic renal ptosis.

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Recurrent gross hematuria associated with calcification of renal papillae. Diagnosis by flexible ureteroscopy

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Aim of the Work: To show the capability of flexible ureteroscopy in diagnosis of the cause of recurrent gross hematuria of undetermined etiology.

Patients and Methods: A 48-year-old lady presented to our urology clinic with recurrent gross hematuria associated with right renal pain of 14 years duration. Patient was investigated several times using urine cytology, intravenous urography, computerized tomography, cystoscopy and bilateral rigid ureteroscopy and all these investigations were unremarkable. She had history of left ureteroscopy and stone retrieval since 4 years before presentation to us. Cystoscopy with bilateral retrograde ureteropyelography showed incomplete filling of the middle calyx of the right kidney with possible narrowing of its neck. Flexible ureteroscopy was done on the right side to evaluate the whole pelvicalyceal system.

Results: The neck of the middle calyx was relatively narrow but could be entered by the flexible ureteroscopy that showed white depositions at the tip of the papillae. Same findings were found in all papillae of all calyces with some of the upper calyx ones showing little ulceration at the tip of the papilla together with white depositions. Biopsy was taken from one of these lesions and the histopathology showed heavy micro calcifications.

Conclusions: Flexible ureteroscopy is useful to explore the whole pelvicalyceal system and to take biopsy if necessary in patients with hematuria of undetermined etiology.

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Narrow band imaging versus white light endoscopic imaging for detection of the upper urinary tract urothelial tumors

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Objective: The conservative treatment of the (UUT-UT) needs a high quality of endoscopic exploration in order to visualize all the existing tumors. Our aim is to evaluate the advantage of using the NBI for detecting the upper urinary tract urothelial tumors.

Methods: From June 2008 to January 2009, 27 patients with (UUT-UT) underwent conservative treatment using flexible ureterorenoscopy with holmium laser. Check ureterorenoscopy was performed in 14 patients as follow up and initial tumor treatment in 13 patients. The endoscopic exploration were done by using the white light and then by the NBI. We used the Olympus URF-V with digital sensor (Charge-couple device) CCD and integral NBI function. The biopsies were performed in case of suspected lesions.

Results: Subjectively, NBI significantly improved the endoscopic visualization of the tumors, providing a detailed description of their limits and vascular architecture. Objectively (out of 35 detected tumors) 5 additional tumors (14.2%) in 4 patients (14.8%), as well the extended limits of 3 tumors (8.5%) in 3 patients (11.1%) were detected by NBI when the findings by WL imaging were considered normal.

Summary and Conclusion: The NBI is an efficient diagnostic method to detect (UUT-UT) comparing to the white-light (WL).

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The use of devices to prevent retropulsion of stone/fragments during ureteroscopic lithotripsy

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Introduction: Retropulsion of ureteric stones and/or stone fragment during ureteroscopic lithotripsy is a significant and frustrating complication. This usually requires further maneuvers/procedures and results in increased morbidity and cost. The object of this study was to assess the effectiveness of these devices to prevent stone retropulsion.

Methods: Our prospective series comprises of 84 patients. In 53 (63%) patients stone cone (Boston Scientific, Natick, Mass., USA) was used. In 31 (37%) N-Trap (Cook Urological Inc. Spencer, Indiana, USA) was used. 61 (72.6%) stones were in the lower ureter and 23 (27.4%) were in the upper ureter. A 6/6.7 F ureteroscope (Richard Wolf Pforzheimer Strasse 32 Knittingen Germany 75434) and pneumatic lithotripsy (Swiss Lithoclast EMS SA, Ch. De la Vuarpilliere 31, CH-1260 Nyon) was used in all cases.

Results: In 2 cases (2.3%) stone fragments of significant size ascended to renal pelvis. There were 3 cases (3.5%) where device undermined the ureteric mucosa. This was recognized during the procedure and the device was repositioned. There were no cases of ureteric perforation. There was no incidence of malfunction with either device.

Summary and Conclusion: The devices to prevent stone retropulsion are a safe and useful tool in the armamentarium of the urologist. The additional cost of the device is offset by the reduced need for additional procedures to deal with residual stones. In order to avoid damage to the ureter, these devices should be advanced into the ureter past the stone under direct vision.

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Novel percutaneous technique for managing difficult common bile duct stone

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Purpose: To report the use of ureteral access sheath and flexible ureteroscopy for treatment of highly impacted common bile duct (CBD) stone.

Methods: Percutaneous transhepatic choledochoscopy (PTC) with stone lithotripsy using laser holmium: yattrium-aluminum-garnet (YAG).

Discussion: Efficacy of percutaneous treatment of biliary tract calculi using flexible ureteroscopy standard technique is now evolving. The approach is by percutaneous transhepatic choledochoscopy (PTC) with stone lithotripsy using laser holmium: Yattrium-aluminum-garnet (YAG) for patient who failed CBD stone clearance using the standard procedures (ERCB) and SWL. We report on one patient who presented with obstructive jaundice and failed traditional procedures, then was stone free after Percutaneous Transhepatic Cholidochoscopy (PTC) and laser lithotripsy using ureteral access sheath.

Summary and Conclusion: The PTC using ureteral access sheath and holmium YAG laser lithotripsy is a safe feasible and effective modality for complete CBD stones, larger multicenter trials are needed.

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Re-trace: A new concept of ureteral access sheath

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Introduction: Ureteral access sheaths (UAS) were developed to facilitate flexible ureteroscope movement. Several UASs were introduced into endourology field. We present in this work a new concept of a recently introduced UAS (Re-Trace) coloplast that allows transforming working guide-wire into a safety guide-wire. Our aim is to evaluate and demonstrate the technical aspects of this instrument.

Materials and Methods: The new UAS, Re-Trace (12/14 Fr) Coloplast, is designed to allow disengagement of working

guide-wire in one step. This guide-wire lies in the ureter besides UAS and becomes automatically a safety guide-wire. In addition, this UAS works as double lumen catheter since contrast can be injected while guide-wire is still in the renal cavities. Patient gender, pre-operative ureteral stenting and UAs placement outcome were prospectively evaluated. Indications for ureteroscopy were mainly stone treatment.

Results: 101 UASs were used in 101 ureters (61 in male patients and 40 in female patients). 28 ureters (27.7%) were pre-stented: male/female ratio appeared to be higher in pre-stent6ed (3.8) than in non pre-stented population (1.2). Overall Re-Trace insertion rate was 83%. Easier insertion was found in female (90%) versus male (77%) as well as (93%) in pre-stented ureters versus (78%) in non pre-stented ureters. This was confirmed when combining gender and pre-stenting parameters: 100% UAS insertion success in pre-stented women, 91% in pre-stented men, 88% in non-pre-stented women and 69% in non-pre-stented men. The guide-wire disengagement was obtained in 100% of cases.

Conclusion: Re-Trace showed good overall insertion rates. Variations related to gender and pre-stenting corresponded to general expectations. This video is to show the properties and insertion technique of this instrument in order to present a new concept of guide-wire disengagement: a single guide-wire immediately turned from working to safety one.

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Laser endoscopic incision of bilateral ureteroceles

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Introduction: Endoscopic incision of ureterocele can be the initial step of management of this pathology. Various methods of incision can be used. Laser endoscopic incision is a precise and bloodless procedure enabling a clean, accurate and controlled cut through the endoscope. Our aim is to show a video for laser endoscopic incision of bilateral ureterocele in a symptomatic girl.

Methods: A 5 years old girl presented with recurrent attacks of urinary tract infection. IVP and ultrasonography were suggestive of bilateral duplex system with hydronephrosis of upper moiety on both sides but no clear evidence of ureteroceles. Cystoscopy showed bilateral ureteroceles with non-stenotic orifices that are located beside each other just as the bladder neck. Holmium laser was used to incise both ureteroceles starting at the bladder neck and extending proximally towards the bladder thus the new orifices are now extravesical. In this video, we showed the use of Holmium laser for endoscopic incision of the ureteroceles.

Results: Two years post-operatively, patient becomes asymptomatic with no more symptomatic urinary tract infection. Ultrasonography showed excellent decompression with decreased hydronephrosis. DMSA scan showed better function of the upper moieties in both kidneys.

Conclusion: Endoscopic holmium laser incision of intravesical ureteroceles is a good method to decompress ureteroceles in the initial management of such congenital anomaly.

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